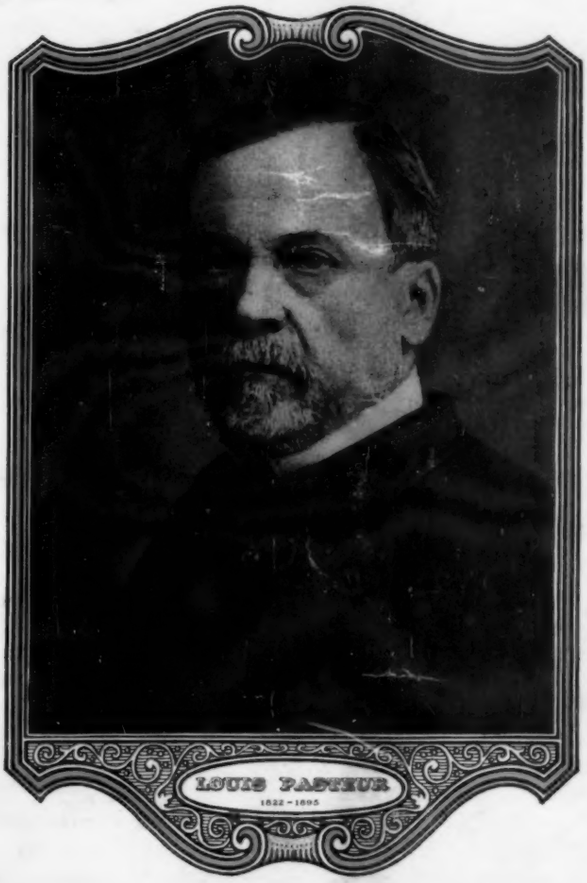
HYGEIA

A JOURNAL OF INDIVIDUAL AND COMMUNITY HEALTH

Published by the American Medical Association



April, 1923 — *25 Cents*

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when one "sticks out" against a cold

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Hygeia

I am Hygeia,
Daughter of Aesculapius and Epione
And child of the full-fruited hills of Greece.

I am Hygeia, Goddess of Health;
Come, follow me up the mountainside
From the valley of sediment to the summits of purity.
I will put the breath of the lilac in your nostrils;
I will make your eyes like the windows to a cloudless morning;
I will pour the fresh roses of dawn in your blood.

I am Hygeia,
And I come wherever men call me.
I walk in the gutters and give them the beauty of meadowlands
Flaming with flowers. I knock at the hovel
And turn all the windows to casements,
Its doors into portals. I hang on its walls in the sunlight
The rich tapestries of clean thoughts.

I am Hygeia;
Give me the prose of the city,
And I will set it to exquisite music.
Give me the wombs of the mothers
And I will banish forever the darkness of birth.
Give me the limbs of the children
And I will give them a power and a fleetness
That shall outdistance all sickness,
And folly and woe and the travails of childhood.
Give me the youths and the maidens
That I may turn all their cravings toward wisdom.
Give me the mothers and fathers
And I will transform all their gardens to kingdoms,
Their homes into palaces. I am Hygeia,
Goddess of Health, crying ever and clamoring
To regain once more the lost multitudes.
Will you not walk with me?
Will you not aid me?

Despair, despair—away forever:
Hygeia comes—the old sores are healing,
The hopeless smile again, the outcast starts anew.
O blessed offspring of Aesculapius and Epione,
I walk with thee to a new heart.

—Anon.

Plain Facts About Health and Disease

HYGEIA

DURING the last twenty years the death rates in all civilized countries, excluding those due to war, have decreased markedly. Without quoting fractional figures it may be stated that the annual death rate from all causes in this country has fallen from about twenty in 1900 to about fourteen for each thousand in 1922. In a population of one hundred million this means an annual saving of about six hundred thousand lives. The causes of these beneficial results are multiple; some of them, at least, may be reviewed briefly with profit.

TUBERCULOSIS

We shall first consider tuberculosis as an illustration. In the sixties of the last century a French army physician, Villemin, demonstrated by animal experimentation that (1) tuberculosis is an infectious and contagious disease; (2) the virus is contained in the discharges from tuberculous men and animals; (3) the disease is transmitted from man to man and from animal to man by inhalation of infected dust or by the ingestion of contaminated food or drink; (4) houses and stables become centers for the transmission and distribution of this disease by being soiled with untreated tuberculous discharges; and (5) the spread of tuberculosis may be restricted by the immediate destruction of all such discharges.

In 1882, the great German bacteriologist Koch demonstrated the presence of the specific virus of tuberculosis in the sputum and other discharges from tuberculous men and animals. Villemin's and Koch's work supplied the world with the essential and basic information needed in the abatement of this disease. A few of the more enlightened physicians and health officers comprehended the value of Villemin's discovery and began to interest the people, even before the confirmatory observations of Koch, in the fact that tuberculosis is a contagious and therefore a preventable disease. It required a much longer time for this idea to permeate the great mass of the medical profession, however, and it was not until the general public became convinced that tuberculosis is a contagious and preventable disease and took an active part in the crusade against it, that the death rate from this cause began to show a continuous decline. The National Tuberculosis Association was not organized until 1904. At that time in all of the United States only a few beds and a still smaller number of dispensaries were devoted to the treatment and prevention of this disease. Today there are nearly seventy thousand beds, hundreds of dispensaries, and thousands of nurses, physicians, and social workers who are training more than a hundred thousand consumptives each year how to take care of themselves and how to avoid infecting others.

In 1900, the death rate from tuberculosis in the United States stood at 202 for each hundred thousand, in 1920 at 114. This means that in the one year of 1920, the number of lives saved from death by tuberculosis, because it had been recognized as a contagious and therefore preventable disease, was 8,800.

The factors in the reduction of the death rate from tuberculosis may be stated in the following order: (1) proof by animal experimentation of the contagious and preventable nature of the disease; (2) recommendation by the medical profession to the people of the application of measures indicated by the experimental work for the restriction of this disease; and (3) the acceptance of the recommendation and the application of restrictive measures by the people.

This is a fair illustration of the way in which scientific medicine has come into existence, has developed, and has resulted in the improvement of the conditions of life. In the first place, knowledge is essential; this knowledge must be tested and adapted to special needs; and, finally, its benefits must be recognized by the people at large. Medicine may be defined as the application of scientific discoveries to the prevention of disease, the development of the highest possible degree of health, and the delay of death. The scientist makes his discovery, usually by animal experimentation; the physician tests its application; and, if the widest good is to be secured, the people must adopt the recommendations and put them into operation.

DIPHTHERIA

In preantitoxin days in certain sections of this country, notably in the region of the Great Lakes, diphtheria killed annually more than 100 of every hundred thousand of the popula-

tion. In the early nineties animal experimentation gave us that marvelous agent in the prevention and treatment of this disease, known as diphtheria antitoxin. In 1894, physicians began to apply this discovery; by 1900 the death rate from diphtheria had fallen to 44 for every hundred thousand, and by 1920 to 15. This, however, does not tell the whole story. It only gives the deaths, while still larger numbers of children have been saved from developing the disease by preventive treatment; nor have we yet reached the possible limit in securing beneficial results from the use of antitoxin. Widespread appreciation of its value by parents, guardians, and school authorities and its early use would further reduce the morbidity and mortality from this disease. When the antitoxin is administered in the first hour after the appearance of the membrane in the throat or nose there are no deaths. The poison of the disease is neutralized by the antitoxin as surely as acid is neutralized by alkali. Recently a simple and safe test has been discovered by which the susceptibility of any child to diphtheria can be determined, and immunity secured for those not possessing it. This is known as the Schick test. It will be discussed in an early number of this journal. The application of this test will enable us to reduce still further both sickness and death from diphtheria.

THE WORK FOR HYGEIA

The preceding statements, which might be greatly amplified, give some of the reasons why the American Medical Association has conceived, planned, and finally launched the journal which herewith comes into actual being. The aim of the Association is to reduce morbidity and mortality among the people of this country to the lowest possible figure. In part it measures its success during the last decades by the decline in the death rate and in the lengthening of life. As the death rate goes down, the average length of life goes up. From the illustrative figures given for tuberculosis and diphtheria, it is evident that the best results can not be obtained without the intimate and cordial cooperation of the medical profession with the intelligent public. It is the purpose of HYGEIA to secure this cooperation.

The medical profession cannot unaided eradicate infection or prevent the spread of epidemics. It is not within its province nor is it its desire to force its recommendations on the public. Recently smallpox of virulent type has destroyed many lives besides seriously crippling business in certain localities, notably in Kansas City and Denver. More than a hundred years ago an English physician, Jenner, discovered an effective vaccine against this disease. During all the intervening years the medical profession has tested and recommended this procedure, and civil authorities enforce this protection among its population or do not according to their wisdom or lack of it.

An obligation, at least a moral one, rests on the medical man to point out how disease may be prevented; having done this, his professional obligation ends. It remains for the people to ignore or adopt the recommendation. The function of this journal will be strictly educational.

HYGEIA will not be devoted exclusively to questions concerning the prevention of disease, although these matters will bulk largely in its columns. It is to be a medical journal for the general reader. It will deal with scientific discoveries that are now employed, or that may in the future be used in the prevention or cure of disease, and with economic, social, political, industrial, and educational problems so far as they have a bearing upon the health and welfare of the people.

FALL IN MORBIDITY

We have referred with some pride to the fall in the death rate as a measure of the success of modern medicine. There is another and quite as important a measure of the success of modern medicine, and this is the fall in the morbidity curve. Men and women are not only living longer than formerly, but they are living with less harassment and crippling by disease. Twenty years ago, practically every inhabitant in the malarial belts of our southern states carried an enlarged spleen, and many suffered a malarial paroxysm every day or every other day. In 1898, one of every five of the soldiers in certain of our camps had typhoid fever within three months after enlistment. During the World War, in camps in the same region there was less than one case of this disease for every three thousand men in two years of service.

While great things have been done in reducing sickness and death, greater achievements are possible, and their accomplishment only awaits the cooperation of intelligent citizens. One of the functions of HYGEIA will be to discuss these questions and in doing this we will need the help of the agriculturist, the manufacturer, and the engineer. In short, if we reach our goal in our efforts to reduce morbidity and mortality to the lowest possible level all intelligent citizens must cooperate, and it is the purpose of HYGEIA to further this cooperation.

EFFECTUAL SERVICE THROUGH COOPERATION

The medical profession has no trade secrets, no knowledge which it wishes to hide, no dogma which it wishes to promulgate. The profession is one of service, and in order to make this service most effectual it must have the cooperation of those to whom the service is rendered. The profession freely and openly proclaims that it still has many unsolved problems. There are diseases, such as influenza, the cause of which is not known, and the spread of which cannot be prevented. At present the best that the profession can do with regard to cancer is to urge the people to give their physicians opportunity for its early recognition and excision while still a local disease. In the meantime, many scientists are earnestly and conscientiously seeking further knowledge of malignant growths, and we may reasonably hope that their labors will be rewarded ultimately.

In our opinion there has never been a time when the intelligent laity has been so appreciative of the medical profession and its work as at present. The service rendered by the profession during the Great War has demonstrated and emphasized its potentiality in contributing to the common welfare. For the first time in the history of war, epidemic diseases did not play an important rôle in any army, friend or foe. In our army with a total of about four millions there was not a death from smallpox, and the morbidity and mortality from typhoid fever were less among the soldiers than among those who remained at home. The French failed to build the Panama Canal, not from lack of engineering skill, but because at the time they did not know how to control malaria and yellow fever. Wealthy persons are giving money in large amounts to medical research and the federal, state, and local governments are supporting health movements as never before. Cities and rural communities are building and supporting hospitals and demanding that all citizens shall enjoy the benefits of the most advanced scientific medicine, both preventive and curative. Scientific medicine which until a few years ago was a mendicant begging pennies at the doors of private wealth and in legislative halls, is now a frequent recipient of great gifts from both private and public sources. A function of HYGEIA will be to discuss these problems from the standpoint of both layman and practitioner.

An old adage says: "The health of a nation is its highest and best asset." This is true in every sense; in war and in peace; in economic, intellectual, and social life. Many a battle has been lost because of the prevalence of an epidemic among soldiers. Extensive areas of fertile land have remained untilled on account of malaria, yellow fever, dysentery, and other infectious diseases. Disease is the greatest factor in the causation of poverty, in the continuance of ignorance and superstition, and in moral depravity. Moreover, it is not sufficient that a nation be healthy, wealthy, and wise in spots or in certain groups of its citizens; these blessings should be extended as far as possible to all. Medicine is a factor in the advance of civilization, and one of the purposes of HYGEIA will be to give the people of this country the fullest and most accurate information on this subject.

PUTTING KNOWLEDGE TO WORK

Discovery in the art of preserving and of strengthening health remains barren and fruitless unless it can be utilized. The discovery that malaria is distributed by a certain species of mosquito was without benefit in malarious lands until it was practically applied, and without the cooperation of the people its full utilization remains impossible. The same is true of other medical discoveries. Diphtheria antitoxin is of no value to the mother who neglects a sore throat in her child until it is too late; and there are thousands of mothers in this country today mourning the loss of one or more children whose death was due to ignorance. In a certain state the supreme court decided that the vaccination of school children against smallpox could not be made compulsory except in the presence of an epidemic of this disease. The result was that there grew up in that state within a few years a large population susceptible to this disease. Epidemics came, business was crippled, thousands of persons were ill, many died—all because of the ignorance of the judges of its supreme court. The high as well as the low need instruction in the nature of disease and its prevention.

Medicine has become one of the important wheels in the machinery of human progress, and it would be well for all to know something of its function. Interrupt our national quarantine, and within a few years plague, Asiatic cholera, typhus fever, and other infectious diseases which we have banished and continue to exclude would be taking heavy toll from the lives of our citizens. Permit the growth of large numbers unprotected by vaccination against smallpox, and faces scarred by this disease will be as common among us as they were in the streets of London before the time of Jenner. Let our cities neglect their

water supplies, and typhoid fever, now almost moribund, will soon be filling our hospitals and cemeteries. Fail to provide hospitals for infectious diseases, and diphtheria, scarlet fever, and similar diseases will soon recover their old vigor and give an upward turn to the curves of death rates and shorten the average duration of life. We are not anticipating that any of these misfortunes will come upon us, but there are many ways in which health conditions of the present day can be improved, and HYGEIA will dwell on these.

ADVANCES IN SCIENTIFIC MEDICINE IN 1922

AS the years go by it is interesting to cast up the figures and estimate the progress made in medical science. That the mortality rate (death rate) has greatly decreased in this country since the influenza epidemics of 1918 to 1920 is shown by federal, state, and municipal statistics for every part of our country and for every class of our people. Unfortunately, there is not a country in the world which keeps reliable morbidity statistics (proportion of disease to health).

In the antimalarial campaign in the southern states it has been shown that preventive medicine is diminishing the number of professional visits made by physicians, and consequently lessening their income. In the Spanish-American war, one American soldier of every five had typhoid fever within three months after enlistment; during the nearly two years of service in the World War, one out of every 2,700 had this disease. With the same admission rate for typhoid fever in 1917 to 1918 as in 1861 to 1862 there would have been 226,001 cases and 62,694 deaths, and with the same rate as in 1898 to 1899 there would have been 291,637 cases and 30,916 deaths; as it was, there were, all told, in the American army during the World War, both in this country and in Europe, 1,083 cases with 158 deaths from typhoid fever. During the five-year period from 1906 to 1910, the annual death rate from typhoid fever for every hundred thousand inhabitants in our cities of more than five hundred thousand population was 25.6; during the five-year period from 1916 to 1920 it was 5.8.

Since 1900 the annual death rate from all causes in the United States has been reduced from more than 19 to less than 13 for every thousand. With a population of 100,000,000 this means an annual saving of some 600,000 lives and a prolongation of the average life by some years. It is a question how much further we can hope to go in reducing morbidity and mortality. There is a limit, certainly, to the latter since all men must die. It is the opinion of those most competent to judge that a further reduction to about 7 for every thousand annually in the death rate is a reasonable possibility and a goal to be sought. This can be done through the cooperation of the profession and the public, but not without this cooperation. There has never been in the history of the world such cooperation as now. It must be stated that the reduction in morbidity and mortality given above does not hold all over the world.

From January 1 to August 19, 1922, more than 55,000 cases of Asiatic cholera and more than twice that number of typhus and relapsing fever were reported in Russia, and it is not at all likely that all cases were reported. Cholera, formerly endemic only in the delta of the Ganges, is now apparently permanently established along the Volga and some of its tributaries. While the area covered by certain deadly diseases is being so rapidly constricted that we are tempted to promise early and complete eradication of these diseases, the endemic area of others is broadening so rapidly that the whole world is threatened; we are ready to ask ourselves if the next generation may not know pandemics quite equal to any of those of the past. There are good reasons for believing that yellow fever was the chief cause of the over-throw of the great civilization of Central America, the extent of which is today known only from the ruins left. The extermination of this disease from this region seems now very near at hand. In 1920, there were, all told, in Mexico and Central America 710 cases of recognized yellow fever; in 1921, 145 cases, and in 1922, up to October 24, 20 cases. Indeed, experts in the epidemiology of yellow fever point to the fact that while less than fifty years ago this disease made frequent excursions to the United States and occasionally into Canada and Europe and Africa, it is now confined to isolated localities in southern Mexico, a few villages in Brazil, and possibly it may be in concealment in the dark corners along the western coast of Africa. Wherever it may be, the expert is seeking it and believes himself to be armed with agencies by which he can destroy it completely and forever.

INSPECTION OF SCHOOL CHILDREN

An important factor in lowering the morbidity and mortality rates has been the medical inspection of school children. The inspector detects diphtheria, measles, scarlet fever, and

other infectious diseases in the early stages and in this way is able to protect not only other children in the school, but also the little brothers and sisters of the infected child at home. The infected child, even before it feels ill, is carried to the infectious disease hospital where it receives treatment in time and under proper conditions. The medical inspection of school children has already more than demonstrated its value and sooner or later the adult will learn that it will be to his personal benefit to submit to a periodic medical examination in order to ascertain if in the machinery of his body there is a screw loose, a bolt missing, or a valve which is not properly functioning.

There are many other factors playing a part in the betterment of health and the prolongation of life. Groups of some of these may be mentioned: (1) improved living conditions among the masses, a better and more liberal food supply and improved housing conditions; (2) the changed attitude of the employer toward the employee, due in part to the working men's compensation act and in part to the awakened and enlightened conscience of the employer; (3) the higher wages of the working man and the greater intelligence with which he spends his wage, less for liquor for himself and more for milk for his children; and (4) factory inspection and hygienic improvement in the conditions prevailing in our work shops; industrial medicine which has come into the shop, aids in protecting the laborer from injury and disease, and promptly takes care of him when accidents happen.

HEALTH, AS WELL AS LONG LIFE

While there is a limit which we are approaching to the reduction in mortality, we are still far from what may be accomplished in the reduction of morbidity. Health has a positive side; it is not enough to live long; it is desirable to live well, and that nation which secures for its citizens the greatest average life with the greatest freedom from disease will in the end possess the earth.

While the greatest advancement in medicine during the year 1922 is shown by the lowest death rate ever reported, the year has not been wanting in other distinct scientific advancements. The list of these is too long to mention and the practical value of many has as yet to be determined. The discovery that carbon tetrachloride is a cheap, safe, and effective agent in the treatment of hookworm infection will hasten the eradication of this disease. Arsphenamine, which has proved of value in the treatment of syphilis, has been found to clear up the loathsome and often extensive lesions of a tropical disease known as the yaws, after the administration of a single dose. A preparation of antimony is making a good showing in the treatment of African sleeping sickness. Indeed, there is today no more promising field of research in medicine than that of pharmacology. The pharmacologist, knowing that chemical constitution is a large factor in determining physiologic action, is now synthesizing drugs which will do almost whatever he wants them to do in the animal body. To the complex molecule he adds a chain or he takes away an atom or he adds or substitutes one group for another and in this way determines the action of his preparation on the animal body.

NEW DISCOVERIES

While we know of no record-breaking discoveries in surgery during the present year, work in this line is constantly advancing. Improvement in technic is being made day by day, and the surgeon is cautiously but constantly going deeper into the lung and cranial cavities in the removal of abnormal growths. There are promising developments in the employment of roentgen rays of greater intensity in the treatment of deep-seated lesions.

The parasite which feeds on and destroys bacteria, and consequently is known as bacteriophage, first described by a worker in the Pasteur Institute in Paris in 1917, continues to occupy the time of many research men, but so far has found no practical application.

One of the most brilliant discoveries of the year comes from the physiologic laboratory of the University of Toronto where a practical method of isolating from the pancreas a ferment concerned in the metabolism of sugar in the body has been discovered. This gives a reasonable hope that there will soon follow a marked advance in the treatment of diabetes.

Further studies carried on by the United States Public Health Service will lead to early control and ultimate eradication of tularemia, a disease found among rabbits, gophers, ground squirrels, and other rodents, which is transmissible to man. This infection has been observed as far east as Ohio, but it occurs more often in the mountainous and Pacific states.

A factor in the reduction in the infantile death rate not already mentioned is the fact that intelligent mothers have learned that a breast-fed child is more likely to live than is one artificially nourished. This important fact has been emphasized during the present year by the demonstration that the colostrum, the

first milk supplied by the mother after the birth of the child, has protective properties against infection. This is true not only in woman, but also in the lower animals.

FOOD POISONING: THE DEADLY BOTULINUS

FROM time immemorial, German peasants, especially those in the Black Forest, have suffered occasional attacks of what they have known as sausage poisoning. There is extant an edict issued by the Emperor Leo, known as "The Wise" and as "The Philosopher," who lived in the ninth century, stating that whereas it had come to his majesty's ears that certain subjects within the empire were in the habit of preparing food mixed with blood, preserving it, and subsequently eating it, the emperor orders that any one found guilty of eating blood preparations should be stripped to the skin, severely flogged, and banished from the country. The German peasant of that time, and in some sections for many centuries after, relied largely on preserved pork for his winter food. He possessed one or more hogs which fattened during the summer and early fall on acorns, nuts, and berries, and did not disdain any creeping or crawling thing which came under the eye on the surface of the ground, or which was reached by the snout beneath the surface. With the coming of winter, the freezing of the ground, and the hiding away of snakes, lizards, mice, and other delectable animals, the hog could no longer retain the fat which it had accumulated, and was ready for slaughter. It was knocked into insensibility by a blow with some blunt instrument, a vessel in the neck was opened, and every drop of blood was caught in some receptacle. There could be no loss of food; every part of the animal must be preserved. The carcass was immersed in a hogshead of water heated by stones which had been kept over an open fire. After this the hair was plucked by hand. The firmer portions, the shoulders, hams, and sides were packed in a chest, freely covered with salt, and thus preserved for future use. The intestine, or gut, from the upper end of the stomach to the lower end was cut into pieces and the natural contents removed more or less completely. The links of intestine, large and small, and the stomach were packed with a great variety of animal and vegetable foodstuffs, including the blood which had been saved in the slaughtering of the animal, chopped and ground liver, brain, peas, beans, and any other available food stuff all mixed with dried leaves such as sage and other condiments. These links were hung in the chimney in the peasant's home, and taken down one by one as the necessities of the family for food might demand. During the daytime these links were often heated, the outer portion at least, to a temperature sufficient to prevent bacterial growth, but during the night when the fire went out the masses of sausage often froze. In March or April, cases of poisoning, many of them fatal, occurred after eating of this food. The local physicians studied these cases with great diligence, and they learned to distinguish by the symptoms between this form of poisoning and that which resulted from the simple putrefaction, or spoiling, of food products. The latter, best illustrated by ordinary cheese poisoning, is soon relieved after nausea and vomiting, and is rarely or never fatal. On the other hand, botulism or sausage poisoning, as it was then known, affects the nervous system, and seldom is characterized by any signs of irritation of the stomach and intestine followed by nausea and vomiting. When these symptoms do occur they are transitory, and subsequently there is marked constipation. There is paralysis of motion of the eyes, the patient "sees double," becomes progressively weaker and, after some days, dies.

In 1895, a Belgian, van Ermengem, by investigating an outbreak of botulism in which twenty-three persons were made ill and three died, was able to prove that the harmful effects were due to a poison which is formed in the food by the growth of a germ which is now known as *Bacillus botulinus*. The germ will not grow in the animal body, but produces its poison by its growth in the food before it is eaten. It belongs to that class of germs known as anaerobes that grow best when the air is, at least partially, excluded. The conditions existing in canned food are, therefore, especially favorable to the development of the bacillus and the production of the poison. The bacillus forms seeds, or spores. These are found in the soil, especially in certain countries. They are deposited with dust on trees, on leaves or fruits or vegetables, and in short, on any object, animate or inanimate, in the locality where these spores, or seeds, exist.

Botulism was not known in this country until recently when several cases of fatal poisoning attracted attention and caused alarm. Up to the present time (April, 1923) one hundred and three outbreaks of botulism have been reported in the United States and Canada. All of these have resulted from the eating of some kind of

preserved food, most of them home canned, but occasionally commercially canned. It seems that every kind of food, fruits, vegetables, grains, and cereals, has been responsible for cases of botulism. Recently Meyer and his colleagues, working at the University of California, have shown that in the virgin soil in that state and in many places in other states, the spores, or seeds, of *Bacillus botulinus* may be found. Strange to say, the mountain soil in regions which have never been contaminated by man or beast seems to contain these spores in greater numbers than do the gardens, pastures, and fertilized fields of the low lands, although the spores may be found, and are found at times, in all these localities. It is interesting to know that Meyer has shown that the spores are most widely distributed and most abundantly present in the soils in the mountainous and Pacific states, less in the Atlantic states, and least in the interior states, those lying between the Alleghany and the Rocky Mountains and constituting the great basin of the Mississippi River.

There are at least two species or strains of *Bacillus botulinus;* each produces its own specific poison. Antitoxins, or antidotes, for these poisons have been produced by treating horses with gradually increased doses. These antitoxins, when used experimentally, protect animals against the action of the poisons, but it is not proved that they are sufficient to save man when they are not administered until symptoms appear. These antitoxins are now manufactured and supplied by the laboratories of the University of California, the University of Illinois, Leland Stanford University, and the United States Department of Agriculture at Washington.

It is suspected that certain forms of vegetable poisoning frequently seen in horses, mules, and cattle may be forms of botulism. This matter, however, needs further investigation.

The American Canner's Association has spent large sums of money in investigating the causation of this disease and in ascertaining the distribution of the spores. These investigations have resulted in improved methods in collecting the fruits, their transportation to the factories, and in methods of sterilization. We may reasonably expect that within a few years botulism will cease to occur. In the meantime, however, it behooves everyone who serves canned foods of any kind to be on the lookout for swollen cans, for suspicious odors on opening the can, and other evidences of deterioration. It should be clearly understood that it is not safe to taste even the smallest amount of food containing the botulism poison. The eating of a single bean from an infected can has caused death.

Dr Charles Thom, United States Bureau of Chemistry, publishes in the *American Food Journal* for November, 1922, these directions for the consumer of canned foods:

When Buying:

In tin—

(1) Both ends should be flat or curve slightly inward.

Neither end should bulge, snap back when pressed or feel loose.

Make no exceptions.

(2) All seams should be tight and clean, with no trace of leaks.

In glass—

(1) The cover should be firm—flat or concave, with seam, collar band and label clean and free from all signs of leak.

(2) The contents should appear free from mold, disintegration, cloudiness or other abnormality and show no discoloration.

Accept only cans in first-class condition.

When opened:

Suction inward is highly desirable.

No outrush of gas or spurt of liquid should occur.

The odor, observed immediately, should be characteristic of the product.

No trace of foreign or objectionable odor should be present.

No disintegration, no mold or other abnormal appearance should be observed.

Liquid enough to cover the food is desirable in most products.

The inside of the can should be clean and bright, or well lacquered, not extensively blackened or markedly corroded.

If you know it is spoiled, destroy it.

If after examining it, you can't tell, add half the volume of boiling water and boil thoroughly.

THE FIRST PERMANENT MOLAR TOOTH

IF ONE were asked what teeth he would dislike most to have his child lose he would no doubt say "the incisors," the front teeth, because, after all, a pleasant appearance means much in a world that is wont to judge largely by appearances. Nevertheless, when a real study of the matter is made, it is found that the tooth one can least afford to lose, both on the grounds of appearance and utility, is not a front tooth, but the first permanent molar. About thirty-five years ago a physician in Paris urged dentists to extract promptly the first permanent molars, for he had proved to his own satisfaction that these are the first teeth to decay; moreover, modern dentists have agreed that caries, or decay, occurs in these teeth in much larger percentage than in any other teeth in the mouth. Then too, it has been thought that in overcrowding of the teeth or in instances of irregularity the molars might be dispensed

with in order to make corrective work easier. Finally, however, Dr. Edward H. Angle pointed out that the first permanent molar is most important for the development of the other teeth, and that malrelation of the molars during development produces characteristic types of dental deformity. Recently Dr. Frederick B. Noyes has confirmed this opinion by a study of a series of cases. He has shown that these molars maintain the normal relationship of the two bones of the jaw during the period of the loss of the temporary teeth and the coming of the new ones. In the child from six to eight years of age, these molars must be depended on for proper chewing of food, for they are firmly attached while the temporary teeth are loosening and disappearing. Their loss always affects the relation of all the teeth to the skull, resulting in the marring of the symmetry of the features. In his discussion Dr. Noyes has made a strong plea for the early care and preservation of the first permanent molars. The very fact that they decay easily and early emphasizes the necessity for early and capable attention to them. Perhaps those persons with overshot or undershot jaws, who seem unduly pugnacious or retiring in appearance, owe their peculiarity of countenance to a fault of development as simply explainable and as easily preventable as this.

WALKING AS AN ART

FROM the many advertised "courses" of exercise one gains the impression that the long-sought cure is at hand. All that is needed is one of these "courses" which is the key that opens the door to abounding health—to "100 per cent. efficiency!" Now some of these "courses" may have something of value in them; in fact, a few of them may almost be worth the price that is charged for them. None, however, will bring about any better general health than can be obtained by the good old-fashioned walk of our grandfathers. It has often been said that if fresh air were a commercial commodity and all that is used had to be purchased, it would be more highly prized and more lavishly employed. It is equally true that if walking were part of a system of exercises that had to be learned through purchased "courses," it would be more popular. A good free, swinging gait; clothing adapted to the weather; shoes that do not cramp the feet and are not too light; a mental attitude that makes you enjoy a walk instead of looking on it as a task to be done—and you have an exercise that will make you more fit than any purchased "course," and a tonic that will put to shame all tonics that were ever put up in bottles. Try it.

ERADICATING YELLOW FEVER FROM MEXICO

MEXICAN sanitarians are making a valiant fight against yellow fever, and are determined to exterminate this disease within the next two or three years. It is quite probable that yellow fever existed in Mexico long before the discovery of the western hemisphere, and there are those who believe that this disease played an important part in the decay of the ancient civilizations of Yucatan and Central America. The courtesy of Dr. Vasconcelos of the State Department of Health of Mexico enables us to present the following figures showing the number of cases and the number of deaths from yellow fever in Mexico during the last three years:

Year	Cases	Deaths
1920	505	249
1921	115	53
1922	41	25

We must compliment the sanitarians of Mexico on what they have already accomplished and express the hope that within two years they will have reached the goal which they are so earnestly and scientifically seeking.

SPRING TONIC

SPRING is here, and with it has come that delicious lassitude we call "spring fever." In an earlier day the housewife or granny went forth in search of "yarbs" with which she made a strong decoction. Perhaps, instead of this bitter mess, everyone from Johnny to the hired man was dosed profusely with sulphur and molasses. It was a time for house-cleaning and body-cleaning. Today in the cities the pharmacies begin their displays of spring tonics. But pep is not to be found in bottles. Granny was right—one must go to the woods to find a cure for spring fever. One searches among the trees and in the fields; one wanders along the bank of some stream; one looks among the grass and ferns for the first signs of spring flowers; one gazes upward toward the sun. And strangely, as the search is continued, long before the ingredients are found, the cure for spring fever develops. When the stroll is completed the medicine has worked. The cure for spring fever is "spring," taken in liberal doses.

The Control of Bodily Processes by Glands

WALTER B. CANNON

SOME years ago a young woman in London, whose previous development had been quite natural, observed that hair was beginning to grow on her face to a conspicuous degree. This unwelcome change was accompanied by gradual disappearance of her superficial fat so that her body lost its rounded contours and became bony and angular. Simultaneously her breasts greatly diminished in size, and her menses ceased. This remarkable condition, in which female characteristics disappear and are to some degree replaced by those of the male, is known as *virilism*. It is associated with tumor or overactivity of the outer portion of a small structure just above the kidney on either side of the body, called variously the adrenal or suprarenal gland. In the case cited, the prediction was made that a tumor of this gland would be found if the abdomen was opened. Since the condition did not immediately endanger the patient's life, the operation was not performed. Some time later the woman had an attack of appendicitis which required operation. While the abdomen was open, the surgeon explored above the kidneys, found a tumor of the gland, and removed it. Shortly after her recovery from the operation, the woman noted that the hairs of her beard were beginning to drop out, that she was growing rotund again, and that her breasts were returning to their former size. Soon her menses recurred. About two years afterward, completely restored to her former feminine status, she married and she has since borne a child.

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Men of great height have always attracted popular attention. Instances of giants of from eight to nine feet high are well authenticated. Such extraordinary length of body—*gigantism*—is the result, chiefly, of the growth of the long bones. This condition is associated with excessive functioning in youth of part of a small gland, the pituitary body, set in a bony pocket of the skull at the base of the brain. When the pituitary gland is enlarged, the bony depression in which it rests must likewise be enlarged to accommodate it. More than a hundred years ago there lived a famous Irish giant whose hand is reported to have been the size of a small ham, and who was so tall that he used to light his pipe at night by tipping it in over the tops of street lamps. His skeleton was obtained and preserved. Recently, after the evidence of the relation of pituitary tumor to gigantism was established, an opening was made in the side of the skull in order to have a view of the interior. There in the floor of the cranial cavity was the bony pocket, showing by its capacious size that this giant, like others of his kind, had had an enlarged pituitary body.

Another disturbed bodily state is observed in the child whose pituitary body is deficient or is injured during the first years of life. The bones fail to grow to full size, the organs of sex fail to develop, and there is commonly an enormous accumulation of fat.

To those who can recall the days of the dime museum, the three persons described are familiar; they are the bearded lady, the giant, and the fat boy. Formerly they were regarded as curiosities of human growth and were referred to merely as freaks of nature; now they are looked on as highly interesting illustrations of the remarkable effects on deep-seated bodily processes which may result from the defective working of certain glands of internal secretion.

The Nervous System and the Circulatory System

In order to have a basis for understanding the services performed by the glands of internal secretion, we must know something of our bodily organization. Our bodies, like a large and diverse community, are composed of many separate agencies, each doing its part for the welfare of the organism as a whole or for the perpetuation of the race. Two great integrating systems, the *nervous system* and the *circulatory system*, bring all these parts into relations with one another. The trunks and branches and twigs of these elaborate arrangements for coordinating and unifying the parts of the body penetrate to all regions. The nervous system is chiefly concerned in adapting the organism to its surroundings; the circulatory system, on the other hand, has to a larger degree the task of managing internal adjustments among the organs themselves.

The nerves act as channels for quick communication, like the telephone and telegraph wires in a community. They are of little service, however, without the sense organs, the special structures on the body surface, or connected with it, which analyze the multitudes of outer impressions—the sights, the sounds, the tastes, and smells—and signal inward along the nerve paths to the brain the occurrence of the outer changes and their intensity. On the other hand, the nervous organization is useless without the muscles as operating instruments. No breath can be drawn, no word whispered, not a glance of the eye is possible, without muscular action. All manifestations of human achievement, from wireless telegraphy to skyscrapers and from go-carts to ocean liners, are more or less direct expressions of the control of muscles by the nervous system. Sense impression, ingoing nervous impulse, internal adjustment in the brain, outgoing nervous impulse, and final muscular contraction make the regular sequence of events which from earliest time has been followed when animals secured food and shelter and protected themselves against their foes.

Sebastian de Morra. A painting by Velasquez. This is one of the most famous of the numerous paintings of dwarfs and endocrine types by Velasquez. The case is believed to be one of a disturbed condition of the functions of the hypophysis.

The circulatory system provides a slower means of linking one part of the body with another than do the nerve channels, and it performs that function by being a common carrier. It carries the energy-yielding and body-building food from the digestive organs to all other regions for immediate use or for storage as fat or starch against a time of want; it carries from the lungs to the needy structures far from the source of supply the oxygen required for internal combustion; it distributes heat from warm to cold areas; it conveys waste materials (carbon dioxide, water, and salts) from where they are produced by the wear and tear of bodily activity to the lungs and kidneys for elimination; and it is the means of influencing, through the internal secretions, all manner of structures and functions, the skin, the nervous system, the muscular activities, the workings of the digestive canal, the growth of hair and numerous others.

The Glands of Internal Secretion

The internally secreting or *endocrine glands* are so-called to distinguish them from others, for example, the salivary and mammary glands, which pour their products outward on the surface of the body or on a surface directly connected with the exterior. Like the glands with external secretions, those secreting internally manufacture peculiar substances, but unlike them they deliver their products into the flowing blood. Thus, these chemical messages are conveyed to every nook and corner of the body and may influence all manner of processes going on in the various organs.

The fathers of medicine were accustomed to speak of the heart, the lungs, and the brain as the "tripod of life." Failure of any one of these organs brings the whole intricate mechanism of the body to the ground. The vital importance of most of the endocrine glands remained unrecognized until relatively recent times. For example, the adrenal glands were regarded as embryonic remnants, in the same class with the appendix. And the thyroid gland in the neck was long supposed to be a device for protecting the important structures there from changes of temperature and from external injury, or serving merely to render the appearance more comely. Now we know that the adrenal glands are essential to existence and that the thyroid gland is capable of determining whether a child shall be an idiot and a dwarf or grow to full stature in body and mind.

The three instances cited at the beginning of this article to show the influence on the organism of the glands with internal secretions illustrate the three main types of effect which they can produce. These glands can influence profoundly the characteristic features which distinguish the male from the female. They can determine growth, especially the growth of bone. They can affect in an astonishing manner not only the rate, but also the nature of the chemical changes which underlie our daily activities. These are essential phenomena in the working of our bodily organization. Other instances will

emphasize still further the potency of the endocrine organs as regulators of some of the most important processes occurring in our bodies.

The Sex Glands

Eunuchism.—Doubtless the internally secreting organs whose influence has been longest known are the male gonads or sex glands. Eunuchism, caused by removal of the testicles, was associated with religious rites before the beginnings of recorded history, and prevailed among almost all primitive races. If this operation, known as castration, is performed early in life, features peculiar to the male fail to appear; for example, hair does not grow on the face; the voice does not change from the boyish soprano; the limb bones grow longer than in the normal person, so that the eunuch is likely to be tall, though the bones are slender and delicate; and the mental traits tend to be those of the weakling, lacking in generosity and courage and marked by trickery and intrigue. Physical changes analogous to these are seen in castrated lower animals. Thus the ox is taller and rangier than the bull, the altered stag sheds his antlers prematurely and they do not grow again, and the capon does not have wattles, comb or spurs, and does not crow. Besides these obvious modifications of growth and these peculiar sex features and behavior, there are marked changes in the endocrine organs left in the body. For example, it has been reported that the pituitary body is enlarged, an effect which may be associated with the elongation of the limb bones in eunuchs, similar to that seen in giants.

Rejuvenation.—The abounding physical strength and vigor, the freshness and keenness of interest, and the vividness of imagination that characterize youth have led many a man to wonder at the mystery of it all. The wish that the extraordinary efflorescence of the vital forces that occurs in the late teens might be renewed in the duller years of declining energy makes the search for the fountain of youth seem most natural. The remarkable period of late adolescence is associated with the maturing of certain cells in the gonads, the "interstitial" cells, lying between the portions which produce the sperm. The inference is easily drawn that the physical and mental exuberance of youth is due to the influence of an internal secretion from this interstitial tissue. In lower animals it has been proved possible to transplant the testis, and, even though the generative cells disappear, the interstitial tissue preserves the typical bodily features of the male. Such successes in lower animals have led to attempts to restore in elderly men, by surgical means, the energy and enthusiasm of young manhood. The results thus far obtained are too meager and equivocal to permit of a positive statement regarding them.

Developmental Precocity.—The influence of the outer portion or cortex of the adrenal gland in producing the state of *virilism* in woman has already been described. When this portion becomes overactive in a young boy, there occurs a precocious development, an early appearance of all the signs of manhood—hair on the body and face, deepening of the voice and other typical changes—together with great muscular strength. This has been called the "infant Hercules" condition, doubtless because of the story of the unusual power of Hercules even as a baby. A similar physical precocity has been attributed to extra-activity of the pineal glands, an outgrowth of the roof of the embryonic brain, but the evidence for that relationship is less well established.

A painting by Juan Careno de Miranda. 1614-1685. Dr. Eugen Hollander classifies this as a case of myxedema, due to disturbance of function of the thyroid gland. There are also evidences of derangement of the function of the hypophysis.

The Rôle of Sex

When we consider the leading rôle which sex plays in the life of the individual, its function in the behavior of man and woman, and its importance for social relations and for the existence of the race, we can realize the great significance of the endocrine organs which determine the proper development of the sex functions. Much still remains to be learned regarding the ways in which these organs produce their effects. The

gonads, the adrenal cortex, the pituitary, and doubtless other of the glands are probably interrelated in a complex of actions and reactions which investigators have only begun to untangle. It will be many years before we have the whole story of the marvelous manner in which the body is prepared for reproduction, and of the sequence of related processes controlled by the various endocrine glands, especially in the female.

The Thyroid Gland

I have already mentioned the part of the pituitary gland in producing giants when it becomes overactive, and in producing fat dwarfs when it is destroyed or injured, or for some reason is insufficient. Another gland which has a marked influence on growth is the thyroid, a gland lying on either side and in front of the windpipe in the throat, and when enlarged usually called a "goiter."

Cretinism.—If the thyroid gland fails to function during infancy and childhood, the result is a creature of hideous appearance. The stature is greatly stunted, the puffy eyelids leave only narrow slits for vision, the chest is contracted and flattened, the abdomen is gross and pendulous, the skin dry and scaly, the lower jaw hangs down, and the open mouth is filled with a swollen and lolling tongue; such is the repulsive appearance of the *cretin.* With the failure of growth of the body there is a lack of mental growth. Complete idiocy is typical; often the only vocal expression is a raucous cry or a silly chuckle.

An American giant, known as Ben Hicks, and called the "Denver Steeple." Gigantism is usually the result of disordered functions of the glands of internal secretion. This figure also shows the large jaw and extremities characteristic of acromegaly. (Gould and Pyle.)

Fortunately, this "pariah of nature" now is seen only rarely in civilized countries, for a substitute for the defective thyroid gland has been found in feeding the thyroid glands of lower animals, such as sheep and cattle. Recently Kendall has been able to isolate from the gland a crystalline iodine-containing substance, thyroxin, which likewise may be substituted for the normal organ. The transformation which can be wrought by such treatment is miraculous. Within a few months after thyroid feeding is begun, the child's mental condition changes from idiocy to intelligence, growth starts and continues at a surprising rate—a gain of half an inch a month is not unusual—and the whole aspect of the face and body may be marvelously transformed from hideousness to beauty.

The thyroid gland, besides affecting the growth and development of the brain, has a marked influence on the rate of chemical change, or metabolism, in the body. We must realize that our bodies obey the great law of the conservation of energy which prevails in the physical world. All the work we do is an expression of the energy contained in the food we eat. This stored energy is liberated in our muscles and other active parts by processes of burning, much as the stored energy of coal is liberated in the firebox of an engine, and just as it is possible to make the coal burn more briskly by opening the draught, so likewise in our bodies the rate of combustion may be changed by the action of the thyroid gland.

Myxedema.—A condition resembling cretinism occasionally develops in adults. The eyelids, the cheeks, the fingers, and other parts become puffy with a thickening of the tissues under the skin, the hair turns brittle and falls out, the body temperature is reduced, and there is mental dulness, attended by physical indolence. The condition is known as *myxedema.* By determining the amount of oxygen taken into the body in a given time and the amount of carbon dioxide breathed out during the same period, it is possible to state the rate at which combustion is going on. When this test is applied to a person affected by myxedema, the rate is found to be much below normal. This slowness of metabolism is ascribable to a defect in the thyroid gland, for study of cases of myxedema has shown that the gland has degenerated or has been destroyed or seriously injured by disease. If thyroid substance is fed, its influence is as remarkable as in cretinism. The swollen, heavy skin softens and resumes its natural texture, the mental and physical lethargy disappears, the rate of combustion in the body rises, and the person is restored to normal. The treatment must be continued throughout life, since the symptoms promptly return if thyroid feeding is interrupted.

Continued eating of thyroid gland, or taking of tablets composed of dried thyroid substance,

will result in great acceleration of the processes of burning. The effect is like that produced by opening the damper in a furnace. Fat and other combustible material stored in the body soon begin to vanish. Indeed, thyroid tablets have been employed to reduce redundant fat. They are dangerous, however, for their effects are not confined to the dissolution of the fatty tissues. They cause rapid and often irregular heart action, nervousness and excitability, and flushing of the skin with perspiration and sensations of heat, and, although the appetite may be increased, the body is likely to waste away because of the excessive combustion which is occurring in consequence of the thyroid's influence.

Exophthalmic Goiter.—The symptoms just described are prominent in the disease exophthalmic goiter. In the patient with this condition, however, not only are there the rapid heart beats, the nervousness and excitability, the flushings, and the increased rate of metabolism observed after thyroid feeding, but also the eyes stand forth from widely opened lids, the hands and fingers tremble and quiver, and there is marked emotional instability. The bodily changes and appearances are those of great fear; the condition, in fact, has been designated "frozen fright." The close resemblance of the symptoms of excessive thyroid feeding and of exophthalmic goiter has led to the conclusion that this disease is due to overaction of the thyroid gland, a state quite the opposite of that seen in cretinism and myxedema, and having quite the opposite effects. In many cases, surgical removal of part of the thyroid gland or its partial disabling by x-ray treatment has greatly mitigated the distressing symptoms.

The Parathyroid Glands

The workings of the nervous system are influenced in a curious manner, as yet not well understood, whenever the parathyroid glands are destroyed or removed. These are four small structures found in the neck, usually near or embedded in the thyroid gland, each one, in man, not larger than the tip of the little finger. They were long overlooked. Only in 1880 were they recognized as different from the thyroid gland, and eleven years more passed before the first evidence was produced that they had a special function. When they are removed, the nervous system becomes highly sensitized to stimulation. The muscles are likely to be thrown into continuous stiffening or into rhythmic twitchings. Moreover, if life continues, the proper deposit of lime salts in the teeth and in the bones may fail to occur. In man, however, as well as in lower animals, loss of the parathyroid glands may result in death. The symptoms of spasm and twitching caused by their absence can be relieved temporarily by injecting parathyroid extract and can be permanently cured by implanting a gland somewhere in the body. The presence of one of the four parathyroid bodies is sufficient to protect against danger under ordinary circumstances. It is an astonishing fact that the services of so important a part of the body as the nervous system can be thoroughly upset and life itself endangered by lack of these small bits of glandular tissue weighing altogether only two grains.

The Pancreas

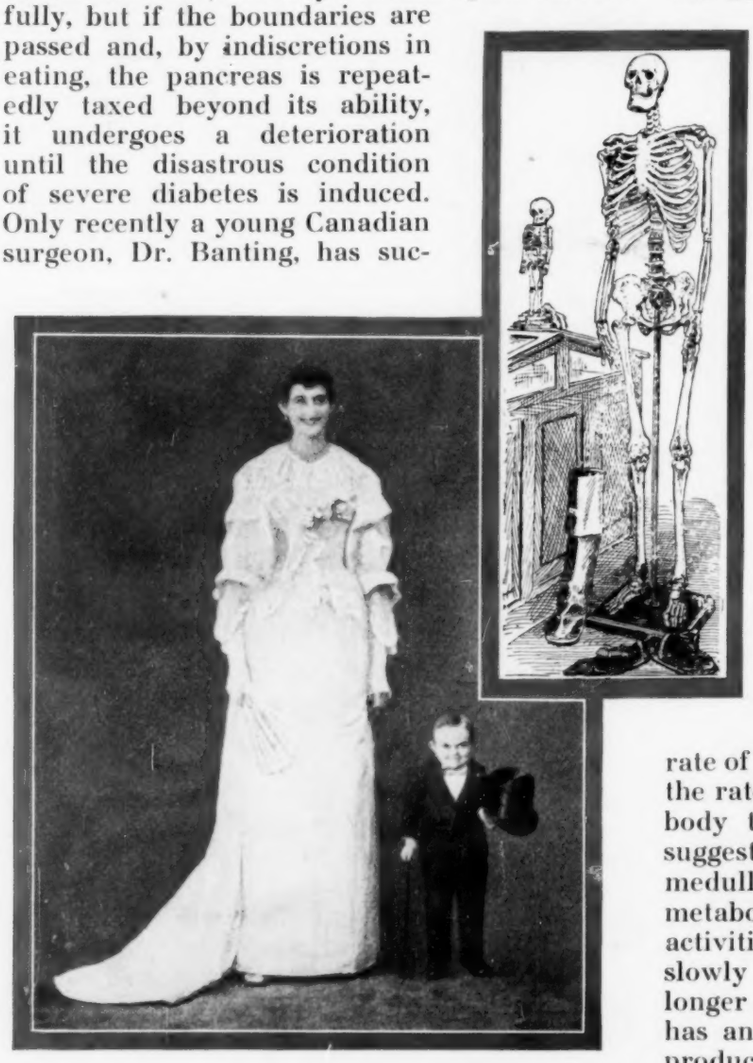
Another gland which influences fundamentally the chemical changes in our bodies is the pancreas, a structure attached to the upper part of the small intestine. This organ produces an

A "bearded lady" like those formerly exhibited in the side-shows of circuses. Abnormal hirsutism is usually the result of disordered function of the endocrine glands. (Gould and Pyle.)

external secretion which is poured into the intestine and an internal secretion which is poured into the blood stream. The cells active in each of these functions are readily distinguishable. Those concerned with the production of the pancreatic juice for the intestine can be made to degenerate without disturbing the others, which continue their service as regulators of important bodily processes.

Diabetes.—How necessary this regulation by the pancreatic secretion is, can be demonstrated readily if the remaining cells are removed. At once all the bodily reserves of food material begin to disintegrate. Fat breaks down and floods the circulating blood, the stored starch-like material, glycogen, turns to sugar and

flows forth from the liver, and the body structure itself begins to melt into sugar which escapes from the body through the kidneys. This is the condition in severe cases of diabetes. In milder forms there is merely a failure to utilize starchy foods after they have been transformed to sugar and passed into the body through the intestinal wall. By experiments on lower animals, Allen was able to prove that the most effective course to follow when the pancreas is incapable of performing its normal function of managing the storage or combustion of sugar, is that of starving the patient until no sugar is escaping from the body and then regulating the diet so that sufficient nourishment is provided, without, however, making too great a demand on the pancreas. This regimen involves a more or less sharp reduction of the intake of starches and sugars. Within such limitations life may continue quite successfully, but if the boundaries are passed and, by indiscretions in eating, the pancreas is repeatedly taxed beyond its ability, it undergoes a deterioration until the disastrous condition of severe diabetes is induced. Only recently a young Canadian surgeon, Dr. Banting, has succeeded in proving that specially prepared extracts of the pancreas can act as a substitute for the defective organ, and can promptly restore the capacity to utilize sugar. The best means of making this brilliant discovery serviceable to victims of diabetes are now being worked out.



Above, skeleton of the "Irish Giant" in the Royal College of Surgeons, London. The skeleton is 92¾ inches in height, and is mounted beside that of Carolone Crachami, the Sicilian dwarf who was exhibited as an Italian princess in London in 1824. The skeleton of the giant was obtained for the London museum by the famous John Hunter. Below, a giantess and dwarf of the same age.

(Gould and Pyle.)

The Adrenal Gland

Still another gland having a striking influence on the chemical overturn in the body is the central or medullary portion of the adrenal. This gland produces a substance which has the extraordinary property of mimicking in the various organs all the changes that are manifested in great emotional excitement. When this substance, adrenin, is injected into a vein even in extremely minute amount, it stops the activities of the digestive organs, drives the blood away from the abdomen into the brain, the heart, and the muscles, raises the height of blood pressure in the arteries, dilates the small bronchioles in the lungs, sets free sugar from the liver, increases the speed of clotting of blood, and in case of muscular fatigue quickly renders the tired muscles again capable of responding to the calls made on them. In collaboration with the part of the nervous system which springs into action at times of great fear or anger, the medulla of the adrenal helps to render the organism more efficient in physical struggle, mobilizing the bodily forces for special effort during what may be a critical emergency.

It is probable that the three endocrine glands which have been mentioned as affecting the chemical changes in the body — the thyroid, the pancreas, and the adrenal medulla — are normally interrelated in their operations. The adrenal medulla, like the thyroid, affects the rate of metabolism. If the adrenals are removed the rate falls, and if adrenin is injected into the body the rate is promptly accelerated. The suggestion has been offered that the adrenal medulla serves for rapid speeding up of the metabolic processes which support our routine activities, and that the thyroid follows more slowly and continues the acceleration for a longer period. Possibly the pancreas likewise has an emergency function, and by its special product aids the active muscles to utilize the sugar that is set free from the liver in times of excitement.

Our Limited Knowledge of the Endocrine Glands

The instances which have been cited do not include all the endocrine glands and do not

include nearly all the effects which they can produce in the body. Enough have been described, however, to show their profound significance for the proper conduct of business in our internal organization, and to reveal the reason for the great interest which they have aroused among medical investigators and among practicing physicians. The known influences of these glands are so striking and so important for the welfare of the individual and the race, that most naturally hope has been stirred and imagination excited to a remarkable degree. Prophets have arisen who are proclaiming a new gospel. A flare of extravagant fancy is now blazing; all the mysteries of medicine are to be accounted for, all the intricate peculiarities of human personality are to be explained in terms of disturbed internal secretion. To this outburst of enthusiasm the reaction is in two directions. There are the gullible who follow the latest fad and find satisfaction always in some new and strange idea, and there are the ultraconservative who revolt against the crudity of the evangelists and will have none of the novel doctrine.

When we take careful account of our present actual knowledge, we find large gaps in it. The conditions under which many of the endocrine glands become active are unknown. Though we talk glibly of the products of these organs, only two effective substances have been isolated and analyzed chemically, adrenin and thyroxin. We are wholly ignorant of the way in which the digestive juices affect most of the gland preparations which are made for sale; we do know that the juices destroy some of these preparations. The degree to which the preparations can be used as a substitute for deficient glandular activity is in most instances quite undetermined. The claims and hopes have been based largely on the astonishing effects which can be produced by feeding thyroid. With the exception of the recent work on the pancreas, however, attempts to duplicate in other conditions of disease or deficiency the successes obtained in cretinism and myxedema have not yielded brilliant results. Furthermore, despite the assurances of the enthusiasts, we are lacking reliable tests for disturbances in many of the endocrine organs. Indeed, we are largely unacquainted with the rôle of most of these organs in normal existence. What happens when they are removed gives only a hint as to their real function and tells almost nothing of the manner in which they evoke their effects

Patient with cretinism before and after the administration of thyroid extract. *(Courtesy of Appleton.)*

It is the object of medical investigators to learn so thoroughly the workings of the body under natural conditions and under conditions of disease, that when any unruly members disturb the health or lessen the natural powers or shorten life they may be brought under control. The endocrine glands exercise such potent influences on our efficiency and well-being that when we know how they operate, we shall probably be in a position to determine the manifestations of sex characters and possibly influence sex behavior, modify the growth of children and of lower animals, and order the rate and nature of chemical change in our bodies. We are still far from attaining these ends. In the presence of both the overenthusiastic and the overconservative, the attitude which is certain to be right in the end is that of demanding rigorously the well ascertained facts, as a basis for both critical judgment and for hope. It is in this spirit that the disciplined investigators in this field are working.

SAID ABRAHAM LINCOLN

"Do not worry, eat three square meals a day; say your prayers; be courteous to your creditors; keep your digestion good; exercise; go slow and easy. Maybe there are other things that your special case requires to make you happy, but, my friend, these I reckon will give you a lift."

Some of the Causes of Eyestrain and Their Prevention

GEORGE E. DE SCHWEINITZ

PEOPLE usually say, when they speak of the inability of any organ of the body to do its work properly, that it is "weak." They speak of a "weak heart," a "weak stomach," "weak eyes," or "weak sight." The medical term for "weak eyes" is "asthenopia"; literally this means "absence of the strength of vision"; it describes a condition usually characterized by tiring of the eyes, attended by pain, headache, local irritation, and dimness of vision, especially when the eyes are used at close ranges or subjected to prolonged effort.

Our eyes are organs of sight, and sight or vision is the ability to perceive objects with them. A little more exactly, sight is the mind's perception of what may be called a specific energy, and the form of energy which causes sight is light, or the rays of light.

The eye may be compared to the camera obscura of a photographic apparatus. The diaphragm, photographic lens, dark chamber, and sensitive plate of the camera correspond to the iris (the "colored part of the eye") and its central aperture the pupil, the crystalline lens, which is behind it, the central chamber of the globe filled with transparent contents, and further within a sensitive sheet of nervous tissue called the retina.

When the camera is directed toward an object, the rays passing through the aperture are bent by the photographic lens, so that they form an image on the sensitive plate.

When the eye looks at an object, the rays first bent by the external lens, the cornea, which is the clear portion of the front of the eye, pass through the pupil, and are again bent by the crystalline lens, so that they reach the sensitive sheet of nervous tissue, the retina, on which the object is projected.

When the object has been sufficiently exposed to the camera, the sensitive plate is removed and the photograph developed. When the rays of light reach the sensitive plate of the eye, that is, the retina, a transformation takes place, and the resulting nerve impulses pass through the optic nerve, and continue along a pathway, called the visual pathway, until they reach a portion of the brain far back, where the mind forms, or transforms, them into the sensations of light, form and color. The object is seen; the photograph is, as it were, developed.

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Normal Eyes

If the focus of the lenses of the eye, that is, their focal length, exactly corresponds with the length of the eye, that is, its visual axis, the eye is adapted to focus parallel rays from distant objects on its sensitive plate, the retina, without effort or strain; an eye so constructed is known as a normal or standard eye. But such eyes are comparatively uncommon; only about 4 per cent. of carefully examined eyes attain this standard.

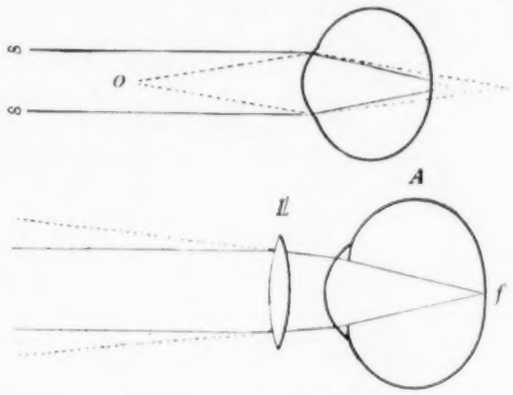
Near-Sighted Eyes and Far-Sighted Eyes

Some eyes are "too short," in which case the length of the eye is shorter than the focal length of the lenses; hence the rays of light coming from distant objects in straight and parallel lines do not reach a focus until they have passed to a point beyond the sensitive plate of the eye, the retina, and therefore the image on the retina is blurred. Others may be "too long," so that the length of the eye is longer than the focal length of the lenses; the rays of light coming from distant objects reach a focus before they arrive at the sensitive plate of the eye and the image on the retina is blurred, or it is not formed. The first named of these eyes is known as the "far-sighted eye," and the second as the "near-sighted or short-sighted eye."

Astigmatism

Defects in the optical construction of the eye, however, do not end with this matter of focus. An important component of the lens system of the eye is the external lens, or cornea, which fits in front of the eye somewhat as does the crystal over a watch. For convenience of description it is divided into meridians. If all of these meridians, vertical, horizontal, and

diagonal, have an equal curvature, the normal condition, the rays of light passing through this cornea are gathered into a common focus, and the image is a single point and clear. Unfortunately, this rarely happens, and one meridian is liable to be "stronger," or have a greater bending (refracting) power over the rays than an opposite or "weaker" meridian. Rays passing through the first or stronger meridian come to a focus before those which pass through the



Focusing of image in a far-sighted eye; correction by use of convex lens.

second or weaker meridian, that is, all the rays do not reach a common focus, hence the image is, for example, a line or a circle or an oval, and is blurred. This refractive defect is "astigmatism"; it is exceedingly common. It may be present whether the eye is "far-sighted" or "near-sighted," and is the cause of great discomfort.

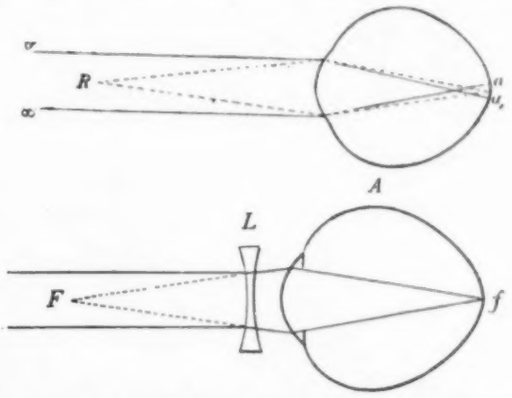
The focusing power of the eye, in order to obtain clear images of surrounding external objects, must be constantly changed according to the distance at which these objects are situated. Such alteration in the focus is brought about by means of a small muscle within the eyeball, which controls a mechanism whereby the crystalline lens, which is elastic, increases its power, that is, becomes "stronger," because its convexity is increased. Naturally, the closer the object is, the greater must be the power exercised. Moreover, in those eyes which are "far-sighted," this muscle must be in constant activity at all ranges; otherwise such eyes could never obtain a clear image of the object regarded, because they, independently of this muscular effort, are adapted to receive only convergent rays. Such rays do not exist in nature, and are not formed unless the parallel rays coming from a distant object pass through a convex lens, or are reflected from a concave mirror. Constant effort, greatly increased when the object looked at is near at hand, produces strain, "eyestrain," as it is called, and the eyes are said to be "weak."

The Muscles of the Eyeball

There is another important cause of "eyestrain." Each eye is provided with six muscles which are attached to the eyeball, and move it in various directions. Normally, the movement of one eyeball is associated with that of its fellow. Each eye being, as it were, a camera, and both eyes being used for seeing, they are so adjusted that the image of the object falls simultaneously on corresponding points of the two retinas, the sensitive plates. If an object is to be looked at, and the right eye is turned to the right, the left eye is also turned to the right, and to the same extent as its fellow; in like manner, if one eye is elevated, the other is equally elevated; if one is lowered, the other is equally lowered. Therefore, although a person receives from every object two sets of sensations, they are blended into one when the movements of the eyes are so arranged that the images fall on corresponding points of the sensitive plate of each eye. If the activities of the muscles are thus "balanced," all is well. But, unfortunately, often they are not so balanced, because, to use an ordinary expression, a muscle or set of muscles may be "insufficient." A struggle ensues; these associated movements, so essential for comfortable and accurate vision, are disturbed, and eyestrain results.

The Eyes at Birth

At birth nearly all eyes are far-sighted; that is, their length (axis) is shorter than that of the normal eye. This condition in a certain sense represents an imperfect development of the eyeball, which, however, may increase its length with the growth of the rest of the body, until it reaches approximately that of the



Focusing of image in a near-sighted eye; correction by use of concave lens.

standard eye. Sometimes this development may not take place, and the eyes remain far-sighted throughout life. With this condition astigmatism may be present, or may gradually develop.

The near-sighted eye, on the other hand, or one with its length longer than that of the normal organ, is rarely present at birth. It most commonly makes its appearance from the sixth to the tenth year of life, especially during school years. That is the reason we often

speak of "school near-sightedness," as myopia. What happens is this: Under the stress of close work, especially if the parents or grandparents are near-sighted, the originally far-sighted eye becomes overdeveloped; that is, its length passes beyond that which is correct or normal, and not infrequently the tendency of near-sightedness is to be not only progressive, but excessively so, especially if astigmatism is associated with the near-sightedness, and if the surroundings are unhygienic.

A large number of eyes are astigmatic at birth, or in the course of time develop astigmatism.

Testing Refraction

These descriptions of the structure of the eye, from the standpoint of its function as an optical instrument, are sufficiently exact to make plain the many reasons why, when the mechanism is imperfect, as it so often is, the distress which has been referred to as "eye-strain" occurs, or why the eyes are "weak." It is such structural faults that the physician describes as "errors of refraction," and they and the imperfect balance of the muscles of the eye produce various symptoms. One of the symptoms which calls attention to errors of refraction is imperfect or defective vision. The physician tests the refraction by means of letters arranged on typecards, and carefully calculated as to their proper size, according to the distance at which they are placed from the person who is being examined. For example, in a good light, a letter about three-eighths inch in height should be clearly seen at twenty feet; it would have to be twice that size to be seen at forty feet. Even though one has excellent or normal vision at all distances it does not follow that the eyes are perfectly constructed. "Far-sightedness" may be overcome by means of the other mechanism described, and the constant effort produces discomfort. Clear vision at all distances does not necessarily mean that the eyes are normal. A "far-sighted eye" does not always see clearly at long ranges, because it may be that the amount of the far-sightedness is too great to be overcome by an effort of the mechanism whereby the strength of the lens of the eye is increased to a sufficient degree.

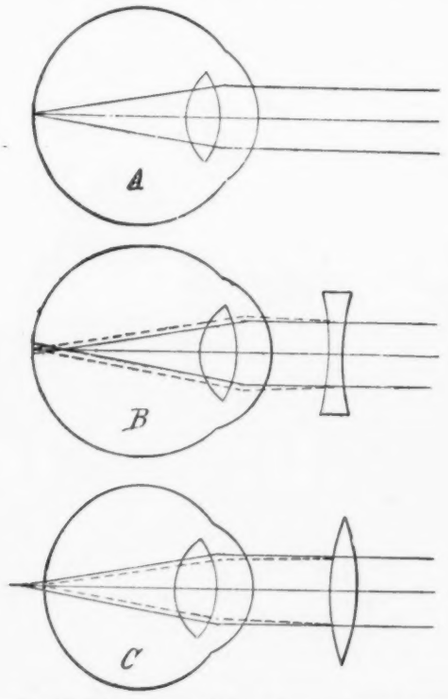
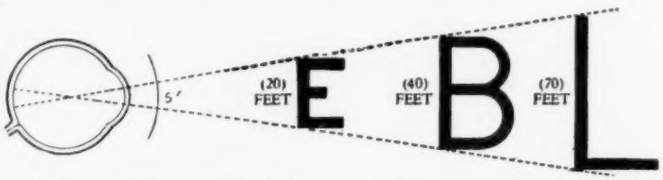


Diagram showing the differences in a normal eye (A), the myopic, near-sighted, eye (B), and the hypermetropic, far-sighted, eye (C). In the near-sighted eye the rays of light are brought to a focus in front of the retina, in the far-sighted eye, behind the retina. In B and C the dotted lines represent the path of the rays after correction by glasses. (Bowditch.)

S A

Letters of this size should be read by the normal eye at a distance of twenty feet.



The acuteness of vision may be determined by the use of Snellen's test types; for example, on the Snellen chart, E should be recognized at a distance of twenty feet, B at a distance of forty feet, and L at a distance of seventy feet. (May.)

When Glasses Are Needed

Although far-sightedness, especially if associated with astigmatism, is responsible for much eye discomfort, it is not necessary that every simply far-sighted eye be "corrected" by spectacle lenses. Many persons with moderate degrees of far-sightedness pursue their various occupations without the need of glasses, without harm or distress, until the time arrives when the eyes are required for close-range work, usually between the forty-fifth and fiftieth years of life.

Persons with near-sighted eyes obtain clear vision at distant points only with the aid of suitable glasses, although vision at closer ranges may be very distinct.

Although small degrees of some of the varieties of astigmatism are compatible with normal sight, usually this defect disturbs the vision.

It is evident that while comparatively few eyes are found to have the optically normal standard, many eyes approach it closely, and for all practical purposes are optically normal. Such eyes do not give rise to discomfort, and correcting glasses are not required, at least, in younger years. There remain, however, a great number of eyes which give rise to symptoms called "eyestrain."

Symptoms of Eyestrain

Headache is a conspicuous symptom of eyestrain; the pain may be in any part of the head, and although the use of the eyes causes the pain, the eyes themselves may be free from discomfort. It is important to emphasize this because the remark is often heard, "I'm subject to nasty headaches, but they can't be from my eyes because they never pain me and I see perfectly." But good vision and painless eyes do not necessarily exclude the organs of sight as a cause of mischief. Another fallacy resides in this sentence, so often repeated: "I read for hours without the slightest discomfort, but I wake up almost every morning with a headache; I don't suppose, of course, that it can be my eyes." Yes, it may be the eyes; often headache and use of the eyes in reading are not coincident.

The use of optically defective eyes at close ranges is not alone responsible for ocular headaches; they may arise in many other circumstances, traveling in trains, associated with nausea, so-called train sickness, going to the theater, overzealous attention to the shopping districts, and too persistent "going to the movies." Moreover, other conditions contribute to the development of the head pain in these circumstances, for instance, poor illumination (poor light, it is usually called), poor ventilation, and impure air. The question is often asked whether "the movies are bad for the eyes." In the earlier years of the development of the moving picture industry, faults in film production and film exhibition produced evil effects, which, owing to careful investigation and recommendations in this country and abroad, have been largely corrected. It is beyond the province of this article to explain the many causes of "eyestrain in cinemas" and what has been done to rectify them. But, evidently, no matter how perfect the films may be, excess in enjoying them must be avoided, and eyes not naturally optically accurate should be provided with suitable correcting glasses. Printed pages of themselves are not "bad for the eyes"; but if the printing is imperfect, the quality of the paper poor, and the illumination unsatisfactory, even if the eyes are normal, or if optical defects are imperfectly corrected, harm and discomfort result.

Improper illumination for reading; the glaring light shines directly into the reader's eyes.

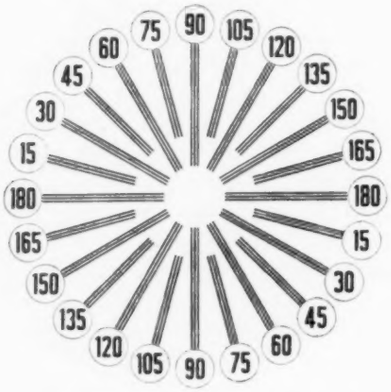
Proper illumination for reading; the light is above the level of the reader's eyes.

Eyestrain is interpreted not only by headaches, but also by many other manifestations which are sometimes called the "eyestrain reflexes." Some of the most usual of these are tilting of one or the other shoulder, eccentric poses of the head, pain in portions of the body far removed from the head and eyes, as in the back, the chest, and at the base of the spine, drowsiness, as well as insomnia, many nervous symptoms, such as twitching of the facial muscles and other muscles, night terrors, general nervousness, nervous exhaustion, and various types of indigestion and intestinal disturbances. These conditions are manifold, especially among children, although by no means confined to them; they disappear if refractive errors and muscle imbalance are

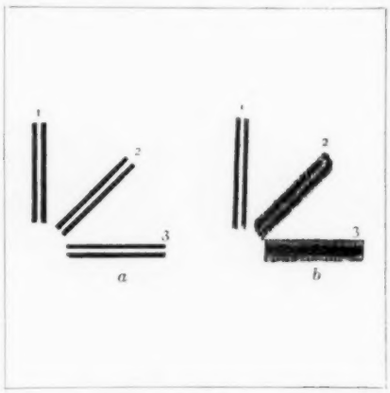
corrected. Of course, all of these conditions may have other origins; but, in searching for the causes, examination of the eyes, as is now appreciated but sometimes neglected, is most important.

The Eyes of the School Child

Many "grown-ups" of mature years will doubtless remember that during their early school days children were often reprimanded, or even punished, because they "skipped words," or "stumbled over sentences," or went to sleep over their tasks, or were excessively restless and nervous. The children were believed to be careless or inattentive or lazy. But many of them were simply manifesting symptoms of eyestrain, and were innocent of any fault which deserved the teacher's displeasure. It is only about fifty years since attention was directed to the many mischievous effects of eyestrain, especially in this country, by Weir Mitchell, Ezra Dyer, and William Thomson, but it took a long time before the wisdom of these observers filtered through communities. Now these facts are well understood, and the investigation which children should undergo before entering school very properly includes an examination of the eyes. If faults are detected, the parents are advised to send their children to their medical advisers for treatment. This wise procedure, which should be universal, has accomplished much good, because the earlier these defects are rectified, the better it will be for their subjects in later life, not only for their eyes, but also for their general physical welfare. Hence the systematic examination of children in primary schools, the correction of refractive errors, and the elevation of the acuteness of vision to a normal standard are constantly urged by educators, teachers, public health officers, and physicians. But this alone is not sufficient; strict attention should be paid to the following conditions: a correct position of the head and body during study hours, secured by means of a suitable desk, the surface of which is so arranged that the printed page is parallel to the child's face, and by a chair of proper height, both in relation to the desk and to the floor; books with distinctly printed type; good, diffuse illumination coming from behind the child, and preferably over the left shoulder; avoidance of glare and sharp contrasts of light and shade; proper ventilation; restriction of hours of study within reasonable limits, and plenty of outdoor exercise.



Wallace's chart, reduced, for determining astigmatism.



Appearance of lines (a) to the normal eye and (b) to the astigmatic eye. (Jackson.)

(Courtesy of Saunders)

These precautions apply with equal force to study hours and to the use of the eyes at home. Too often there is indifference to this advice, giving cause for the remark of a great schoolmaster in a moment of irritation, "More eyes are harmed in the home than in school." A sentence in a well-known novel is often quoted and may be repeated: "The light was going fast. With the disregard of youth for its most precious gift, Elsa strained her eyes to thread her needle once more." This is exactly what Elsa should not be allowed to do; nor should she be permitted to read in bed before breakfast, crooking her head at improper angles, or to sit reading in darkening places in the room, or when the lamps are lighted so to place herself that a tilted shoulder casts a shadow on her book, or to use a light which sends a glare on the page or into her eyes. Electric lights are often said to be "bad for the eyes." The source of the light is not the mischief-maker, but if the light is improperly shaded, or not shaded, and the naked flame produces a dazzling illumination, harm necessarily results. Parents wonder why Elsa "gets headaches and is sick at her stomach," is restless, nervous, peevish, pale and physically unfit. "She must need a tonic," says the anxious mother. The doctor is consulted. Very proper! But the tonic will not cure the difficulty if the eyes are at fault; and even if they are not optically at fault, or being so, are corrected, if Elsa is allowed to break all the perfectly plain, simple rules of ocular hygiene, harm is the consequence.

Crossed Eyes

It is not an uncommon belief that young children having "crossed eyes" will outgrow them. This is nonsense. One might as well say a child will outgrow a clubfoot or a harelip. Treatment should be begun early.

The Eyes as a Part of the Body

The eye is not confined, as it were, to a little area of its own, subject to diseases and defects unconnected with the rest of the body. Quite

the contrary. It is most intimate in its relations to the rest of the human system. Many of its maladies and inflammations depend on morbid conditions elsewhere in the body, and on imperfections in diet and nutrition. Moreover, the eye often indicates where faults exist, in the blood vessel system, the kidneys, the brain, and the spinal cord. Many of its inflammations are caused by infections in the teeth, the tonsils, and the intestinal tract. It must be "treated" medically and surgically, exactly as all other organs of the body are treated. The problems which surround it, whether they relate to optical faults or to disease, are medical problems, and must be solved with this fact always in view.

Does Meat Cause Cancer?

WILLIAM H. WOGLOM

ON APRIL 4, 1663, Mr. and Mrs. Samuel Pepys of London had seven guests at dinner. To these nine persons there were served, according to Pepys' Diary, "a fricassee of rabbits and chickens, a leg of mutton boiled, three carps in a dish, a great dish of a side of lamb, a dish of roasted pigeons, a dish of four lobsters, three tarts, a lamprey pie (a most rare pie), a dish of anchovies, good wine of several sorts, and all things mighty noble and to my great content."

And yet the statement is often made that the consumption of meat is increasing! It would be difficult to match this array of meats and fish today at a small private dinner among the middle class, to which Pepys and his wife belonged. Nor is their entertainment an isolated example of gluttony; diet in general was much more abundant, particularly in meats, than we of today are accustomed to serve. All signs, indeed, point to a constantly decreasing use of meat and an increasing consumption of fruits and cereals; and lest the reader dismiss this remark as a mere expression of opinion, let me say that figures compiled by the United States Department of Agriculture prove a steady decline in the amount of meat consumed per capita in this country.

Well, what of it? What difference does it make how much meat a man eats, provided he can pay for it? It makes this very practical difference: Meat in excess is not entirely harmless—wherefore and why, we will not discuss. On the other hand, meat eating is being blamed for some diseases for which it is not responsible. One of these diseases that is said to follow a too liberal indulgence is cancer. If this is true, we want to know it. But is it true?

The question of a possible relation between cancer and diet in general was already under discussion among the physicians of the second century, and in the latter half of the nineteenth renewed interest was aroused, and attention focused on meat, in a rather interesting way, and as the result of a total misconception. It had been noticed that prisoners almost never develop cancer, and it was suggested that this happy circumstance might be a result of the simple and practically vegetarian diet on which, willy-nilly, they lived. But it was not then appreciated as fully as it is today that one of the most important causes of cancer must be age, since those under forty rarely fall victim to the disease. The average age of prisoners happens to be about twenty-five years, and here we have a simple and correct explanation of the rarity of cancer among them.

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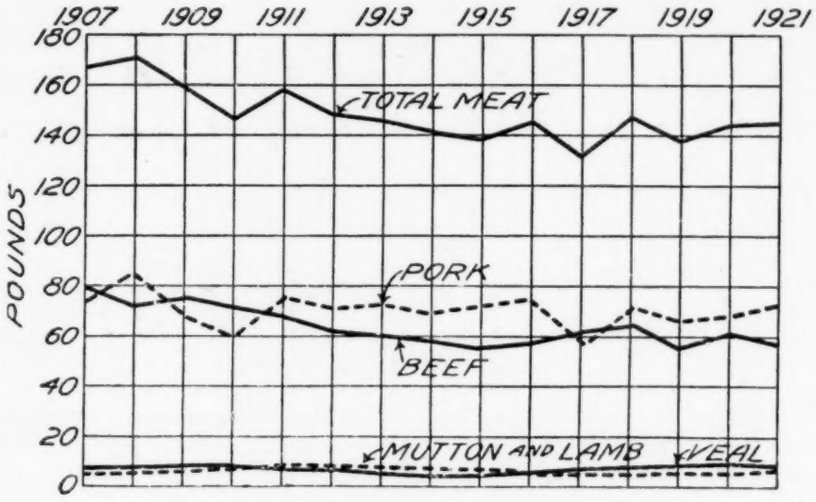
Returning to the question of meat, the food which is most often blamed for cancer, it has been said that the consumption is rising and that this is causing cancer to become more frequent. It would seem that the youngest student of logic could point out the fallacy here. It is this: that the parallel course of two events is no proof that one of them causes the other. For example, there are more automobiles in use today than there were a hundred years ago, and there are also more cases of appendicitis reported. Does the automobile, then, cause appendicitis? Obviously not. There are more cases reported because appendicitis was unknown a hundred years ago; when a person had it he was said to be suffering from inflammation of the bowels or peritonitis.

The Reporting of Cancer

And so it is with cancer. Beyond a doubt there are more cases being *reported* today than ever before; but may this not be because the skill of the physician is constantly increasing, so that he is now able to discover cancer where his forefathers would have been entirely at a

loss for a diagnosis? Cancer, particularly when it affects the internal organs, is sometimes extraordinarily difficult to diagnose; for this reason many mistakes have been made in the past, and, to the intense regret of the medical profession, errors are still being made, though the number of wrong diagnoses is much smaller than it was. At any rate, this is the explanation given by some very eminent statisticians and physicians for the apparent increased frequency of cancer. Again, the public health official has been so painstaking and so efficient that the expectation of life has been considerably lengthened, until nowadays a man can be reasonably sure of living about ten years more than his grandfather did. Clearly, this increases the number of persons who survive long enough to reach the cancer age, as the period of life after forty is called, and so must augment the number of cases of cancer.



Per capita consumption of meat, 1907 to 1921.

The reader will now have some idea of the difficulty involved in answering a question apparently so simple as whether or not cancer is becoming more common. The diagnosis in every case must be exactly right, and the figures must be, as the statisticians say, corrected for age distribution.

Thus far we have learned that the consumption of meat is steadily growing less, and that there is no proof of an increase in the number of cases of cancer. But we have not yet found out whether eating too much meat is a cause of this disease. To discover whether it is or not we must survey the occurrence of cancer among races whose diet is exclusively vegetarian, and among animals.

Comparative studies within the last few decades prove very clearly that cancer is common among races that do not eat meat, and that it affects such animals as the horse, cow, sheep, and rabbit, which by no stretch of imagination can be regarded as carnivorous.

How is it with other articles of food? Almost everything that man eats or drinks has been blamed at one time or another, including fish, the pleasant and innocuous tomato, and the less innocent and late lamented John Barleycorn. Again a verdict of innocent must be returned for lack of any evidence of guilt, except, perhaps, in the case of alcoholic drinks and spices. These may, by irritating the alimentary canal, cause a certain number of cancers of the mouth, throat and stomach; in any case, cancer of these parts seems to be more common in heavy drinkers than it is in abstainers. And if any one doubts that whisky and spices are injurious to delicate membranes like those lining the throat and stomach, let him try dropping a little whisky or a grain of pepper into his eye.

No Proof that Meat Causes Cancer

The upshot of our whole inquiry is, therefore, that we have no proof of an increase in the number of cases of cancer. We know that the consumption of meat is actually diminishing, and that cancer often attacks men and animals living on a purely vegetarian diet. Hence there is not a shred of evidence to show that meat plays a part in the causation of this disease.

THE HEALTH ALMANAC

From the days of Poor Richard in this country, and even long before abroad, the almanac has been a favorite means of bringing to the attention of readers significant facts of philosophy or life. As is well known, the attractiveness of the almanac as a permanent advertisement was used and abused by the makers of patent medicines to bring their wares constantly to the attention of the public. During the last few years, the Bureau of Mines, the United States Public Health Service, and many health departments have been publishing almanacs of health interest. One of the most attractive of these has been issued by the Louisiana State Board of Health. It is arranged in the usual order of almanacs, giving a calendar with meteorologic data concerning the moon and the sun. This almanac is a far more serviceable contribution to the daily life of the farmer, and of the citizen of the town, than the usual, crude, fallacious, disease-producing almanac liberally distributed by the manufacturers of nostrums.

Public Health and the Citizens' Military Training Camps

MERRITTE W. IRELAND

THE prevention of disease during the last fifty years has had a marked effect on civilization, not only by adding years to the normal life span of man, but also by influencing for good the economic development of the resources of the world. While these accomplishments have been due primarily to scientific discoveries, they would not have been possible without the assistance of the public. The remarkable improvement in the general health during recent years has emphasized in many ways the fact that such improvement in the health of any community, large or small, must depend on the active and intelligent cooperation of the persons comprising that community.

MERRITTE W. IRELAND, M.D., is surgeon-general of the United States Army; he was chief surgeon of the American Expeditionary Forces in France until October, 1918. In this article he voices his belief that the influence of the military training provided by the summer camps will be for the good not only of the health of the men in training, but also for the good of the health of their friends and families.

Control of Infectious Diseases

Knowledge is power: Public health can be secured only if the people know the necessity of public health measures. The decreasing incidence of infectious diseases during the last quarter of a century is proof of the result of the public's support of health measures of proved merit. For instance, in 1900 typhoid fever killed twenty-seven of every hundred thousand inhabitants of ten of the larger cities of the United States, while in 1920 the death rate was only 2.6 for every hundred thousand inhabitants of the same cities. The methods by which typhoid fever is carried from person to person had been known to students of the disease for many years prior to 1900, but preventive measures could be carried out only after the public had been convinced that typhoid fever germs are carried by water and food, and that with pure water and clean food the disease almost disappears. In the communities which then demanded pure water supplies and the supervision by health officials of the production and distribution of milk, vegetables, and other foods, the incidence of typhoid dropped.

In cities each person lives so close to his neighbor that he is convinced comparatively easily that he must protect himself against the infections which his neighbor may spread. In the country, however, the situation is quite different. Here, each person or family lives more or less apart from other persons or families, and because of this distance is likely to consider health measures unnecessary. The results of such careless ignorance and the lack of interest in the work of health authorities are illustrated by the death rate from typhoid fever for the rural part of the registration area of the United States: 9.6 for each hundred thousand of population in 1920, when it was 2.6 in the ten cities just mentioned.

The drop in the death rate from typhoid fever when all known measures are taken to prevent the disease is proved by the experience of the army in garrison, camp, and field. The enforcement of such measures in the army is largely a question of discipline and individual training. Under these circumstances it was possible to reduce the number of peacetime deaths from typhoid fever in the army from thirty-three for each hundred thousand in 1904 to none in 1913. The reduction under the stress of war is even more striking. During each year of the Civil War an average of 1,120 deaths from typhoid fever occurred for each hundred thousand federal troops, and during the Spanish-American War 1,410, while during each year of the World War this average was reduced to seven. This reduction in the health and death toll of a disease that was formerly the scourge of all armies came after all water supplies had been purified, all questionable food avoided, and all soldiers vaccinated against typhoid fever, an enforcement in the army since 1911. Without a doubt, like results may be obtained in civilian communities, and there is no reason why they cannot be obtained.

Many another fight has been won against epidemic diseases with the help of the individual and the community. The effort to prevent smallpox by the vaccination of schoolchildren, and the antimalaria and antihookworm campaigns among the inhabitants of the southern states were all successful because the people affected were interested; but this help-

ful interest is possible only when each person is convinced of the need of such efforts.

Accurate mortality statistics for civilian communities have been available for only a comparatively short time, so that the great progress which has been made in the prevention of disease is best indicated by the statistics for the army. One hundred years ago, an average of thirty men of every thousand in the army died each year of disease, while today the average is only three, a reduction of 90 per cent. Similar advances have been made in civil life in the control of certain infectious diseases; but, invaluable as this work has been, it is not, by any means, enough.

Prevention of Organic Diseases

There can be no doubt that one of the most vital needs before the American people today is that of preventing the development or staying the progress of organic disease, using the term in its broadest sense to include all physical abnormalities not of a very infectious nature. A sound body is the basic requirement of good health. Structural defects, abnormal development, chronic diseases, and defects due to breaking the laws of right living strike at the foundation of health, reducing the net efficiency of the human body in proportion to the damage done. These abnormalities are found in all walks of life, and are doubly regrettable because most of them might have been prevented.

Defectives Barred from Military Service

Physical examination of more than 4,000,000 young men on their entrance into military service during the World War gave the basis for a survey by Major Albert G. Love which plainly shows the great need of universal knowledge of the rules of health. This study of the physical records of 2,510,000 drafted men between eighteen and thirty years revealed the astounding fact that physical or mental defects were recorded for 1,289,403, or 51 per cent. Furthermore, it was found that 21 per cent. were physically or mentally unfit for any military service.

The character and seriousness of the defects found among the drafted men varied greatly, and, of course, occasionally one man had two or more defects. Among the men who were physically defective, including those rejected as physically unfit, 1,533,937 defects were found; of this number developmental defects (listed as hammer toe, bunion, flatfoot, pronated foot, painful feet, defective physical development, clubfoot, deficient chest measurement, underweight, underheight, malnutrition, cleft palate, and harelip) made up 28.6 per cent., heart lesions 7.9 per cent., tuberculosis 5.3 per cent., hernia 3.7 per cent., and defective teeth 2.5 per cent. The men rejected as physically unfit for any military duty had a total of 867,420 defects, of which developmental defects numbered 14.2 per cent., heart lesions 12.9 per cent., tuberculosis 9.3 per cent., hernia 4.2 per cent., and defective teeth 3.2 per cent. Although the presence of these defects does not tell the whole story, it does indicate the general effects on the health of the nation of neglect, ignorance and poor social conditions. It is quite evident that many of the abnormalities might have been corrected in their earlier stages, while others represent the penalty for the violation of nature's laws. Many factors, such as racial influences, occupation, and the driving force of economic conditions, are involved in the production of these defects, but the indisputable fact remains that by far the greater number could have been prevented or eradicated in their early stages had the health measures of today been known and applied.

The average citizen believes that military service requires a much higher degree of physical fitness than do the activities of civil life. If equal efficiency is demanded in each instance, this opinion is, of course, false, since the unfit man is hampered in his vocation, be it civilian or military, in proportion to the degree of his disablement.

Physical examination of an applicant for military training. He must have good lungs.

Camp Vail, New Jersey. This gives an idea of the locations considered suitable for the Citizens' Military Training Camps, and the type of buildings and tents.

Since the safety of a nation in the time of war depends on the efficiency of her soldiers and sailors, the government has the right to oversee the activities and health of the military man in such a way that his physical fitness will be maintained and his physical defects removed whenever possible. The person in civil life, on the other hand, must maintain or improve his physical fitness through his own efforts, and consequently he often neglects this essential to his success.

Since all health measures for the prevention of organic or chronic bodily abnormalities depend, as in the control of infectious diseases, on the help of the people, their knowledge of conditions and needs is the first step in progress. Educational propaganda need not take up scientific facts and theories of disease, but it should deal with measures known to prevent such conditions; these are, after all, only the rules for right living.

The Citizens' Military Training Camps

The War Department, recognizing that knowledge is the first step to health, is attempting to spread broadcast the gospel of good health through the summer training camps. The plan of the summer training camps to provide voluntary military training for young men is yet in its infancy, but even now it is an invaluable means of infusing the principles of health and the need of physical fitness.

During the summer of 1921, 16,500 men were admitted to all federal training camps; in 1922, the number increased to 35,500. Of those admitted in 1921 to the Citizens' Military Training Camps, about 10,000 were from seventeen to twenty-five years of age, while in 1922 it was possible to provide training for about 22,000 from this age group. Both years the men who were trained, other than those in the Citizens' Military Training Camps, consisted of members of the Reserve Officers' Training Corps and of the Organized Reserves. Besides the federal training camps, the National Guard camps furnish military training to a comparatively large number of men.

Health of Men on Entrance

For entrance to a Citizens' Military Training Camp, the applicant must furnish evidence that he is physically fit to profit by military training. This evidence is secured through a physical examination by a physician at or near the home of the applicant. This preliminary examination serves a threefold purpose: It provides a means of selecting tentatively men who are physically fit for training; it benefits the community by impressing on the rejected the need of giving serious attention to their health; and it gives the friends and associates of the applicant some idea of the value which the government places on physical fitness in selecting those who are to be trained as protectors of the nation. Although this examination by the family physician is usually very careful and eliminates the physically defective, 957 of the 23,300 who reported at the camps in 1922 were rejected or discharged because of some physical defects that would markedly interfere with their training. Many of these defects were due to preventable causes, or at some time in their course could have been eradicated by corrective measures. For example, 13.7 per cent. of the rejections were on account of defective vision, 13 per cent. hernia, 7 per cent. organic heart disease, 7 per cent. underweight, and 6.3 per cent. flatfoot. Some men were accepted who had minor defects that were not disabling and could be corrected partially or completely. In fact, it has been found that the healthful regimen of the training camp

Building bodies; physical exercise is necessary to good health and strength.

Interior of a barracks of a Citizens' Military Training Camp. The men sleep with head and feet alternating, in order to avoid spreading contagious diseases.

alone improves or cures many such defects. The 22,343 accepted men presented 11,109 defects sufficiently important to be noted on the records. Among these, flatfoot constituted 21.8 per cent., defective vision 14.8 per cent., defective physical development (including underweight) 10.8 per cent., and infestation by hookworm 4.2 per cent. Whenever practicable, treatment was given, and in all cases the parents of the trainees were notified in writing of what had been found.

Care and Improvement of Health During Training

Once the applicant is accepted, he is made immune to typhoid fever and smallpox by vaccination. There is then no danger of his contracting either disease while in training camp or for a number of years afterward. It is now the policy of the War Department to have the vaccinations completed before the training camp opens; the principal advantage from a medical point of view is the opportunity to impress on other members of the community the importance of this means of preventing disease.

The man in training camp lives a life which, in the majority of cases, is an entirely new experience. Here he lives according to the laws of health, so far as these can be regulated by the camp authorities. He has supervised activities in the open air, regular hours for sleep, and wholesome food. He soon learns that proper care of the body brings increased physical and mental efficiency. The drills and exercises train in the coordination and team work necessary in the proper performance of military tactics, and at the same time improve the general health to a degree seldom possible in civil life. Furthermore, he receives instruction in personal hygiene. He is taught the value of proper clothing and the necessity of a clean body for his health's sake. He is thoroughly instructed with regard to the dangers of venereal diseases. Incidentally, the value of this instruction is proved by the fact that among the 22,343 men in the Citizens' Military Training Camps for the one month training period during 1922, only six contracted a venereal disease, a record of which any community might well be proud.

The good effects of military training are evident in the strengthening of the muscles, development of the chest, and the adjustment of the body weight toward normal. The changes tend to transform the slouchy, poorly developed youth into an alert man who not only possesses the physical ability to perform efficiently his work in life, but also the knowledge that will help him to keep fit.

Another important feature of the summer training camp is the prompt and efficient care of minor ills and injuries in the up-to-date hospitals provided for every camp. To illustrate: There were 22,343 men in the Citizens' Military Training Camps in 1922; 2,973 cases of disease and injury were recorded, with only two deaths, both due to appendicitis. Many were admitted to a sick status for causes that would have passed almost unnoticed in civil life. This is in keeping with the policy that every man be watched closely at all times, and the slightest ailment investigated and treated promptly. Not only is his welfare in camp thereby provided for, but also he is taught the wisdom of medical attention for apparently unimportant infections and injuries so that more serious conditions may be avoided.

Once the necessary knowledge to winning good health is acquired, the next step is the forming of good habits to keep it, and it is in habit forming that military training has a particularly good effect on health. Military tactics train men so that in an emergency they will act unconsciously and collectively. Forming good health habits is, of necessity, a part of this training, and habits then formed are not forgotten at the end of the camp life. They are carried back, consciously or unconsciously, into family life. Consequently, the trained military man of the Citizens' Military Training Camps through his contact with other members of society is an influence for good on the health of the community. As the number of young men permitted to receive this training increases as the years go by, every village and city in the United States should have men who have received this training, and whose physical fitness and habits for good health will be an incentive to others to observe and profit thereby.

Music in the Treatment of the Sick by American Indians

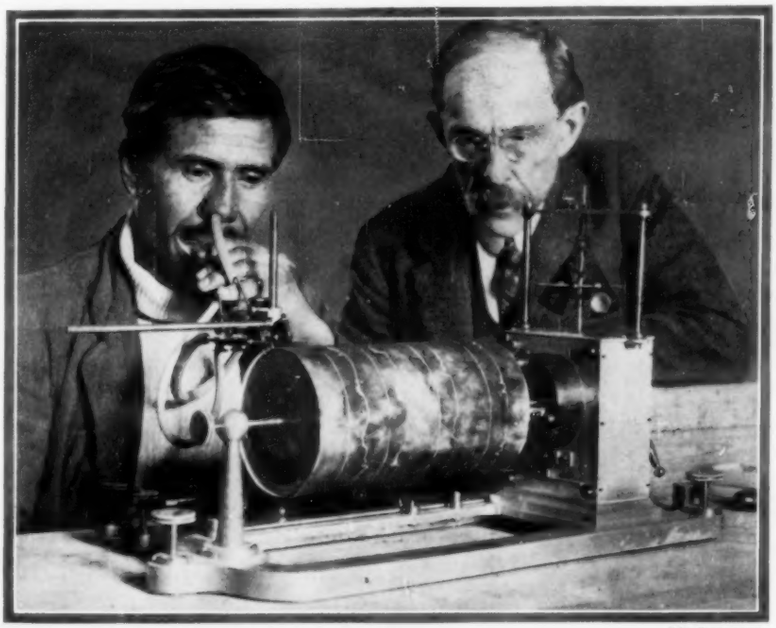
FRANCES DENSMORE

THE white race has a way of discovering, one after another, facts that the American Indians have known for centuries. One such discovery is that music has a healing value. We are more emotional than the Indians; at least we express our emotions more freely, and hence we conclude that the beneficial effects of music are due to the association of emotional ideas. Thus it is argued that a majority of instances of mental derangement arise from thwarted affections, and that the love song is found to be beneficial in treating such disorders. The afflicted person may have heard the song under happy conditions and it arouses pleasant memories; hence the benefit. It requires little experimentation to find that "jazz" is unduly stimulating, and that a lullaby is soothing; but neither the arousing of associations through a love song nor the use of these simple forms of rhythm should be termed scientific, or the results considered conclusive evidence of the value of the method.

FRANCES DENSMORE has made a study of the music of the American Indians for the reports of the Bureau of Ethnology, Smithsonian Institution of Washington. The knowledge gained from the Indians leads her to wonder whether the musical treatment of the sick may not be used for the white race much oftener than it now is.

The Indian medicine man treats physical as well as mental or nervous disorders with the aid of music, but there is no appeal to the emotions in his method. Instead, it appears to be based on the actual power of rhythm. For about fifteen years I have been associating with the old medicine men of several tribes, in connection with my study of the music of the Indians for the Bureau of American Ethnology of the Smithsonian Institution at Washington.

Some of the medicine men of the various tribes administer herbs and say that they sing in order to make the herb effective. Others sing without using material remedies. I have recorded phonographically more than one hundred songs used by Indian medicine men and women when treating the sick, with descriptions of their methods of treatment. Sometimes a medicine man uses affirmation as part of his method. Thus, a Chippewa medicine song contains the words, "You will recover, you will walk again. It is I who say it. My power is great." This was sung for a person unable to walk. A Yuma medicine man said, "After singing my fourth song, I always ask the patient if he feels better. The sick man has always said that he felt better."



Underwood

"Taking a picture" of the Quiche Indian language. Dr. William Gates of Washington, D. C., president of the Maya Society of America, recording the Quiche Indian tongue on the smoked paper cylinder of the mymagraph, the "wave writer" widely used for ethnological study, as Cipriano Alvarade, a full blooded Indian, talks into the mouthpiece.

The Sioux medicine men have songs for various ailments—a song to be sung when adjusting a fractured bone, a song for headache, and a song for diseases of children. The Papago of Arizona have special songs for every imaginable ailment and, like the northern Indians, they believe that healing songs are given them by certain birds and animals. There is nothing in the words of these songs to arouse any associations in the mind of the patient. When the medicine man is not praising his power or that of his guardian

animal or affirming the recovery of his patient, he uses words that are poetic. The song is usually sung four times, then follows a pause, after which the song is again sung four times.

Beating a drum or shaking a rattle is part of the bedside treatment of the Indian medicine man. In some instances this is done without singing, and is so emphatic as to stimulate the patient to action if any life remains. Drum and rattle have a steady, throbbing rhythm which holds the attention of a sick person and undoubtedly has some effect, but it is the song that is considered the important part of the treatment.

The rhythm of one Chippewa medicine song is as positive and energetic as that of "Onward, Christian soldiers." No one can hear it without feeling its force and vitality. The words are in praise of the doctor's mystic power, "in a dream I was told to do this." The rhythms of other songs are more subtle. The Indians are masters of rhythm. We hear of their warlike proclivities and their trivial customs more often than we hear of their occultism, in which rhythm forms an important factor.

It would be interesting to test the Indian medicine songs in the treatment of the white race by music, not within too narrow limits, as in the song for reducing a fracture, but in the larger outlines of the soothing and stimulating melodies, apart from any association of ideas. Our use of music for the sick is still an experiment. In the old days the health of the Indian race was in the hands of the medicine men, and who can say that they were not successful? The medicine men considered music essential to a cure, and who can say that the Indians were not physically superior to other races? A few old men remain who know the old songs of the days when the healing art was closely allied to religion. Perhaps these old men, with their ascetic lives and tremendous powers of concentration, could teach the white race a lesson in the curative power of rhythm.

What Is a Chromosome?

JULIAN HUXLEY

THE astrologers held, and humanity believed, that the planets exerted an overwhelming influence on the destinies of man. The ascendency of one or the other planet at the time of his birth determined his character; a favorable or unfavorable conjunction, his good or his evil fortune. Today we ascribe, if not the turn of events, yet all the main lines of character, and that large bulk of fortune that springs from character, to the influence of the tiny bodies which we carry locked within the cells of our body, and call the chromosomes.

JULIAN HUXLEY is a teacher of biology in New College, University of Oxford. He evidently has inherited from his grandfather, Thomas H. Huxley, the art of making plain the teachings of science.

They were discovered in the middle of the last century. In each cell or ultimate living unit of the body it was found that there existed a set of these little bodies, sometimes rodlike, sometimes oval, sometimes V-shaped, which, owing to their strong affinity for dyes, were christened chromosomes or "colored bodies," and so could be stained and rendered easily visible.

Fifty years of patient work has taught us many new facts about them. They are usually invisible when the cell is resting, but appear when it is about to divide; in any one species of animal or plant their number is always the same; when the cell divides they each split lengthwise and divide too, so that each daughter-cell gets a complete set. Finally, their number is an even number, and they are really a double set, consisting of a number of equal pairs; one member of the pair has come from the father, one from the mother. The chromosomes especially concerned with the determination of sex are an exception. Usually there is a pair in one sex, only a single one in the other. Just before the animal forms its reproductive cells, a special process occurs by which the number of chromosomes is reduced to half, the members of each pair being separated from each other. As a result, the reproductive cells each have half the ordinary number of chromosomes, a single instead of a double set.

Fertilization consists in the union of a male reproductive cell or sperm with a female reproductive cell or ovum; and so two single sets of chromosomes are brought together, and the double number is restored once more.

The Bearers of Heredity

All this was remarkable enough, and set people guessing and speculating as to whether these microscopic threads of stainable substance were not that veritable essence of the race, the

A, chromosomes of the mosquito Culex (after Stevens); B, chromosomes of the fruit-fly Drosophila (after Metz). Both of these forms have an unusually small number of chromosomes. (Guyer.)

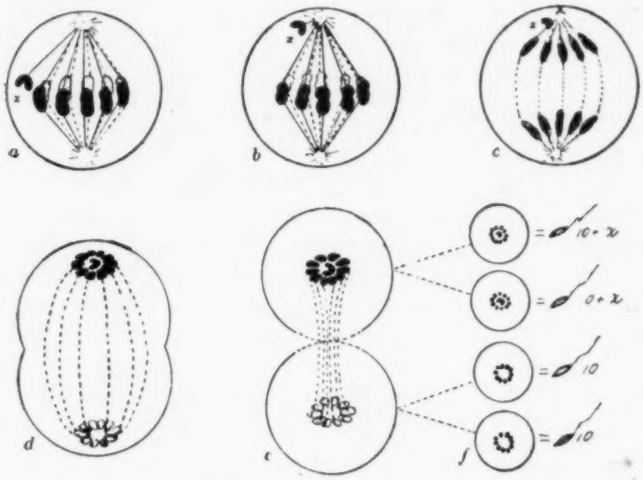


Diagram illustrating the behavior of the x-element, the sex-chromosome in the maturation of the sperm cell. In one of the two maturation divisions (represented here as in the first) it passes undivided to one pole (a, b, c), in the other it divides. Since the cell without the x-element also divides, the result is that ultimately from the original primary spermatocyte (a) four cells are formed (f), two with the x-element and two without it. Half of the spermatozoa therefore will bear an x-element, half will be without it. In a the ordinary chromosomes, arbitrarily indicated as 10, are supposed to have already paired for reduction so that the original diploid number in spermatogonia (undifferentiated cells in the seminal tubules) and body cells of the male would be 20 plus the x-chromosome. (Guyer.)

bearers of heredity. It was left, however, to Professor Morgan of Columbia University and his pupils to demonstrate this beyond dispute. Their researches were carried out on the little fruit fly *Drosophila,* whose convenient habit of breeding in captivity in any bottle or tube that may be provided, and of producing a new and abundant generation every ten or fourteen days, has made it possible for them to carry on pedigreed breeding experiments on more than a million flies in a comparatively few years. Furthermore, all that we know as to other animals and plants and man himself goes to support the detailed studies on *Drosophila,* and to show that the process of heredity runs on similar lines in all higher organisms.

Briefly, then, the work of Morgan has gone to show that each chromosome is the bearer of a number of hereditary units, called *factors* or *genes.* These are arranged in a row along the chromosome, like beads along a string, and probably number at least several hundred in each chromosome. Each of these is responsible for something in the make-up of the animal; one mainly influences the color of its eyes, another the shape of its wings, another its size, another its fertility, and so forth. They are, in fact, the arbiters of its destiny, the controllers of its living processes, its form, its instincts; it is they that make it what it is. If one of them were different, the animal would be different, either in itself or in the offspring which it produced.

Each of them appears to be a living unit, capable of self-reproduction, and each has its own appointed station, in a particular chromosome, and at a particular place in the chromosome. The whole set of chromosomes and their contained factors is thus a vast unit of almost inconceivably complicated structure—many hundreds or even thousands of factors arranged in a particular way, each of these consisting of one or several molecules of living substance, each of these of several hundred or even thousands of atoms arranged in a fixed relation, and these in their turn composed of electrons circling in a fixed number and an orderly system.

It is the differences in the chromosomes that brings about the differences between species, that makes a bat a bat and not a bird, a cow a cow and not a horse, that differentiates a negro from a white man, or one individual white man from another.

If knowledge is power, then what accumulation of power awaits the generation that shall penetrate fully into the secrets of the chromosome!

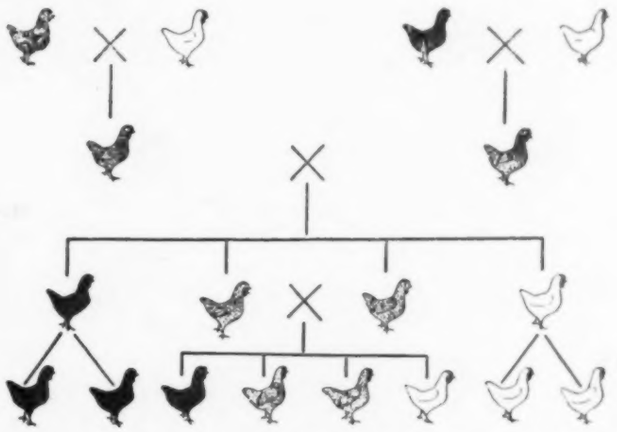


Diagram showing the scheme of inheritance in the blue Andalusian fowl. (From Guyer.) "The so-cal'ed blue Andalusian fowl," according to Guyer, "results from a cross of a color variety of fowl which is black with one which is white with black-splashed feathers. The result is the same, irrespective of which parent is black. When bred with their like, whether from the same parents or different parents, these blue fowls produce three kinds of progeny, approximately one fourth of which are black like the one grandparent, one fourth white like the other grandparent, and the remaining ha'f, blue like the parents. Moreover, the black fow's obtained in this way will, when interbred, produce three kinds of progeny, approximately one the white fowls."

Louis Pasteur and His Work

VICTOR C. VAUGHAN

IN the village of Dôle in the Jura, was born, December 27, 1822, a child destined to assume an important rôle in the progress of scientific medicine. If greatness is measured by the extent of the good done one's fellow men, the name of Louis Pasteur deserves to stand high, not only among those of his contemporaries, but also among those of all ages.

Pasteur's origin was from a humble class. This is not in contradiction of, but in conformity with, the law of heredity. The history of the Pasteur family has been traced back to the middle of the seventeenth century. The great-great grandfather was a serf, and neither he nor his wife could write their names, as is shown by the record of their marriage. The great grandfather was born a serf, but purchased his freedom, and both he and his wife signed their names to the marriage certificate. Of the grandfather little is known; he died in early manhood. The father, Jean Joseph Pasteur, served in the Napoleonic wars in the famous Third Regiment, renowned for the bravery and intelligence of its individual members; at the time of the demobilization of the grand army, he had won the rank of sergeant-major and wore the cross of the Legion of Honor. This short sketch of the history of the family along the male line shows consistent progress and is an illustration that good blood often flows in the veins of the lowly. Of Pasteur's ancestry along the female line we know little; but what we do know indicates that the Pasteurs had shown good sense in the selection of their wives.

VICTOR C. VAUGHAN, M.D., has been a student, teacher, and leader in medicine for almost half a century. From 1891 to 1921 he was dean of the department of medicine and surgery at the University of Michigan. During these years he contributed much to medical literature. In this sketch Dr. Vaughan describes Louis Pasteur's tireless efforts and life-long research in the field of bacteriology.

Education

Between Louis Pasteur and his father was a bond of intelligent love which held them closely together throughout life; the father, as long as he lived, understood and appreciated the researches of his son. There is nothing wonderful to tell about the youth and pupilage of Louis Pasteur. At an early age his father determined that he should have a good education, and both father and son looked forward to the Normal school at Paris as the place where this training could be best acquired. It was a question whether the preliminary schooling necessary for admission to the Normal should be taken in some provincial institution or in Paris. At sixteen years Louis was sent to Paris and arrangement made whereby he was to fit himself for admission by study in a preparatory school. However, as has happened to many others, the sixteen year old boy found himself the victim of a severe attack of homesickness in the great city, and so longed for his old home and his father's tannery that he gave up his stay in Paris and finished his preparatory work in a provincial institution. At twenty years he passed the examination for admission to the Normal, but with no great brilliancy, the paper being marked mediocre. In the laboratories of the Normal and in the lecture room of the Sorbonne, he came under the instruction of some of the greatest French scientists of the time, especially in chemistry, at that time under the direction of Dumas. He continued for a few years after graduation as a laboratory assistant in the Normal, and it was during this time that he demonstrated his intelligence and skill in the solution of a perplexing problem in physics.

Later he taught for one year at Dijon, where he had no facilities for experimental research. Then he was transferred to Strasbourg. Here, it appears, within a few weeks after his arrival he fell in love with, proposed to, and was accepted by a daughter of M. Laurent, rector of the university. The letter to his future father-in-law on this occasion is an example of the unswerving honesty which characterized both the personal and scientific activities of Louis Pasteur. In this letter he spoke plainly of his humble origin, and stated that he had only health and courage in bank, that he intended to devote his life to scientific work, and that he had no prospects of being able to secure luxuries for his family.

Work on Tartaric Acid

At Strasbourg, Pasteur continued his research on right-handed and left-handed tartaric acid. In pursuing these studies he made, at his own expense, visits to practically all the laboratories in continental Europe in which tartaric acid was obtained in quantity. The brilliant solu-

tion of the right-handed and left-handed tartaric acid puzzle which had so long perplexed such great chemists and physicists as Biot and Mitscherlich, brought the young chemist to the knowledge of his contemporaries in that line of work. Since this problem has only indirect connection with the great work of Pasteur's life, we shall not go into detail concerning it. In 1854 Pasteur, at only thirty-two years, was made dean of the new Faculty of Science at Lille, the capital of the richest center of industrial activity in northern France. He remained in that position for only a short time, but his stay in this place greatly broadened his horizon and opened up a new field of endeavor which he was soon to enter, and in which he was to make discoveries beneficial to mankind and essential to the welfare of the race.

Observations on Fermentation and Infectious Diseases

During Pasteur's stay at Lille, he became interested in fermentation as manifest in the manufacture of wine, vinegar, and beer. In one of his Lille speeches he said, "In the fields of observation, chance favors only the mind which is prepared." He demonstrated the truth of his statement in his own work. On leaving Lille, Pasteur returned to the Normal in Paris, from which he had been graduated, but this time as a member of the faculty. Here most of his great work was done. Before Pasteur's most important researches are considered, it might be well briefly to call attention to the theories that had prevailed up to that time concerning fermentation, spontaneous generation, and the causes of infectious disease.

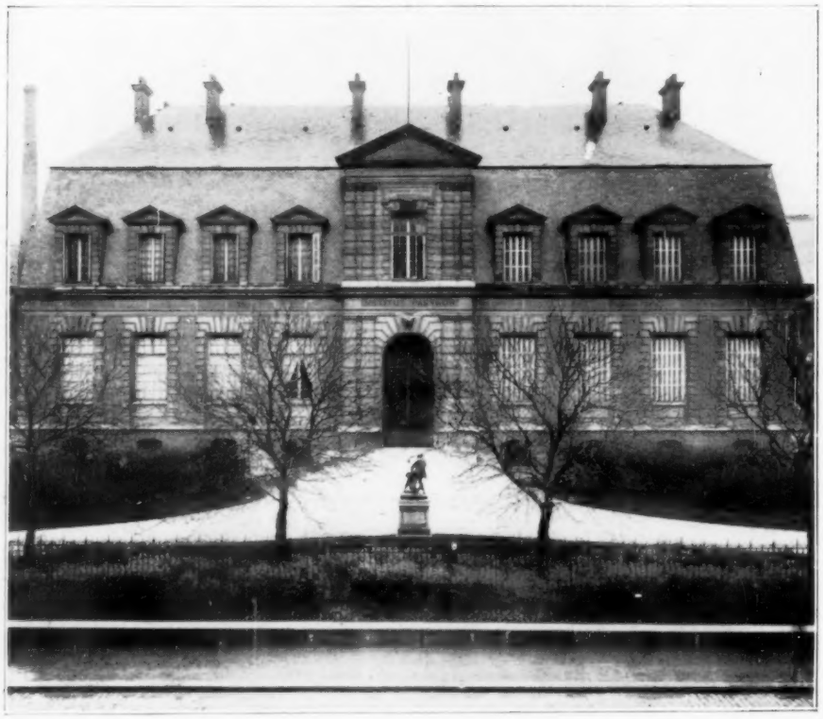
Old Conceptions of Fermentation

Primitive man had observed and had utilized fermentation in the preparation of wine, vinegar, bread, and cheese probably before the species had developed into *Homo sapiens*. From time to time, some unusually intelligent person had theorized as he watched the bubbles rise in the fermenting grape juice as it was being converted into wine, or as he saw the distention of the dough in the leavening of bread, and had asked himself what the cause of these phenomena might be. Some went so far as to believe that fermentation might have something to do with the causation of disease. This view was held by that peripatetic, much abused philosopher of the early sixteenth century who called himself Theophrastus Bombastus Paracelsus; Paracelsus came to the conclusion that even life is nothing more than a result of chemical activity. One hundred years later Jean Astruc reasoned that if infectious diseases are due to fermentation there must be a specific ferment for each disease; this theory, he concluded, reduced the proposition to an absurdity, so he cast it aside. The great authority on fermentation at the time when Pasteur began his work on this subject was the professor of chemistry at the University of Munich, Justus Liebig, who stood as the autocrat of chemical and physical science. Liebig believed that fermentation is due to a process of oxidation, that it is a chemical procedure depending in no way upon life. He recognized the fact that the inoculation of a fermentable substance with even a tiny bit of fermenting substance causes fermentation to proceed in the whole, and that by transplanting from time to time, the process might be extended indefinitely. But he did not believe that fermentation is due to living organisms. Indeed, the demonstration of microorganisms and the discovery that yeast is a living, growing, multiplying cell was not made until in the third decade of the nineteenth century.

Only a short time before Pasteur began his work there had been a sharp discussion between Needham, an Irish Jesuit, and Spallanzani, an Italian priest, concerning spontaneous generation. The former made infusions of animal and vegetable matter and heated these on warm ashes in order to destroy any seeds that they might contain, and found that subsequently these preparations swarmed with microscopic life and underwent putrefactive changes. This, Needham claimed, demonstrated scientifically that life does originate spontaneously. Somewhat earlier, others, Van Helmont among them, had published recipes for generating vinegar eels and even for the creation of mice. Spallanzani repeated Needham's experiments with more care and scientific accuracy. He boiled his flasks for an hour, hermetically sealed them, and found that when thus prepared they could be kept indefinitely without putrefaction in the contents. Indeed, before the time of Pasteur, Appert had devised the method now employed so largely in canning food, and had demonstrated its practical success. The explanation, satisfactory at that time, was that the food is preserved because all the oxygen is driven out of the can. There was no recognition of the presence of bacteria or their spores in the food subjected to these processes.

The earliest hypothesis concerning the cause of infectious disease, and one which still has a strong hold on the belief of mankind, teaches that disease is an infliction imposed on man by some supernatural power. It has been attributed to evil spirits, or a dispensation of their gods. In no book, down to the eighteenth century, is an epidemic discussed without being attributed, in part at least, to the wrath of God. Luther wrote that pestilence and disease are naught else than the devil's work. Our own Cotton Mather described disease as *flagellum dei pro peccatis mundi*. Another doctrine taught that all the joys and ills of man are determined by the position of the heavenly bodies. There

are persons who firmly believe that pestilences are caused by the spots on the sun, or by the juxtaposition of certain planets. Our own great lexicographer Noah Webster wrote two volumes to prove that epidemics are due to earthquakes and other terrestial disturbances. Hippocrates and his followers for many centuries reasoned that when many people become ill simultaneously, the cause must lie in that to which all are exposed, and this could be nothing else than the air. This gave rise to the belief that diseases, in large part at least, are due to miasms or vapors rising from the earth and carrying their deadly contents into the vitals of all. Less than fifty years ago the cause



The Pasteur Institute in Paris.

of infantile diarrhea was sought in the exhalations from the earth, in the breezes from this or that point of the compass, or in some unknown terrestial disturbance, while the feeding of children with poisonous milk continued day after day and carried the infantile death rate higher and higher.

Study of Wines and Beers

During the sixties the wine industry of France suffered severely because in some districts the wine became too acid; in others its taste became unpleasant, while in still others it became ropy or oily. Pasteur had studied alcoholic fermentation until he had determined that yeast is the only ferment essential for the conversion of sugar into alcohol; and when he examined these abnormal wines he found that all contained ferments other than yeast. For the most part, these accidental and undesirable ferments appeared as bacteria. After a study of diseased wines, Pasteur was able to describe with certainty, by a microscopic examination of the sediment, the changes that had taken place in a given vintage. It was therefore plain that if the growth of these foreign bacteria could be prevented, the wine would not deteriorate. In order to destroy or inhibit the growth of these undesirable organisms, two methods of procedure were open to him, and both of these had been employed empirically and imperfectly in certain localities: He could add to the wine some germicide or antiseptic which would delay or wholly prohibit the growth of bacteria. It had long been the custom not only in France, but also in other wine-producing countries, to treat the interior of casks with fumes of burning sulphur. The sulphurous gas acts as a disinfectant and entirely destroys or delays the growth of any bacteria that may be in the wood. The other method was to heat the wine after it had reached a certain stage or had completed the alcoholic fermentation; but it had long been known that if wine is boiled it does not age and remains stale quite indefinitely.

Since wine is acid, Pasteur very quickly realized that the growth of these foreign germs might be checked by heating the wine to a temperature of about 56 C. (132.8 F.), and maintaining it at this temperature for only a short time. The low temperature and the brief exposure permit the oxygen in the wine to remain, do not interfere with the ripening process, and do not depreciate the value of the vintage. It therefore became the custom to heat wine to 56 C.; this does not wholly destroy the bacteria, but is sufficient to prevent their development. This method of treating wine is now practiced in all wine-producing countries, and is known as pasteurization.

Later, French beers were found not to come up to the desired standard. They suffered in comparison with the German beers and the English ales. Pasteur worked on the problem, found the cause to be foreign germs, as in the case of the wines, and proposed the same remedy, which proved to be effective. Pasteur did not attempt to patent these procedures, to keep them secret, or to prevent their adoption by foreign wine growers and brewers. Indeed, in his studies of beer, Pasteur went to England, and without cost pointed out to the manufacturers of ale how they could select pure yeast and prevent undesirable contamination

with micro-organisms. It was a Dane who, profiting by the experiments and demonstrations of Pasteur, took up the trade of supplying brewers and others with pure yeast. Fortunes were made by an Austrian firm which sold pure yeast for the preparation of bread. In this country for years we paid high prices for so-called pure yeast, the preparation of which was based on Pasteur's discovery.

At the time when Pasteur was studying these fermentations, two methods were employed in the manufacture of vinegar. In France, hogsheads containing dilute wine or other alcoholic solution were only partially filled, and the surface was freely exposed to the air. On these surfaces there grew a ropy, fungus-like body, and so long as it remained exposed to the air it converted the alcohol into acetic acid or, in other words, it converted wine or other dilute solutions of alcohol into vinegar. If by any chance the growth on the surface of the hogshead fell to the bottom or was insufficiently supplied with air, the contents of that hogshead "went bad." In Germany, dilute alcoholic solutions were allowed to drip into a cask filled with beechwood shavings. Pasteur studied the growth on the surface of the fluid in the casks; he examined microscopically the delicate coating which formed on the beechwood chips, and found that in both cases the growth consisted of a micro-organism known as the vinegar eel, *Mycoderma aceti.* This discovery enabled the manufacturers of vinegar to put their processes on a scientific basis. It will be seen that already Pasteur had contributed scientifically to three great industries, the manufacture of wine, of beer, and of vinegar, and had removed the processes of preparation of these products from mere chance and empiric methods to the dignity and certainty of exact scientific procedures.

Pasteur had gone further in his work than the study of alcoholic solutions and the conversion of alcohol into acetic acid; he had shown that the souring of milk is due to a ferment now known as the lactic acid bacillus. When milk, instead of souring naturally, grows ropy, becomes bitter, or develops other abnormal and undesirable diseases, there is, as in the case of wine and beer, an invasion by some other organism. In his study of fat fermentation, Pasteur became aware of the fact that certain bacteria or ferments need an abundance of air for their full development, while others thrive only when the air is almost or completely cut off. Early in his work, therefore, he distinguished between those ferments growing best in air, which he designated aerobes, and those growing best when the air is excluded, which he designated as anaerobes. This peculiarity explains why the vinegar ferment grows only on the top of the wine in the partially filled casks, and why the growth is even more luxuriant when the alcoholic fluid is allowed to trickle over beechwood chips covered with the ferment.

Pasteur had by this time shown that all the fermentations which he had studied were due to specific organisms. He was able to grow each of these in what we now know as pure cultures, to sow the seed and to reap the harvest with the same certainty that the farmer scatters his wheat and his barley. It was then essential that the question of spontaneous generation should be settled with scientific finality. Do these ferments come into existence spontaneously without ancestors and without inheritances? If this is the case there is no possibility of scientifically controlling fermentations, whether in wine casks or in the animal body. Does smallpox or scarlet fever or diphtheria develop in a community as the result of the anger of some supernatural being, or does each disease arise from a natural cause? It will be impossible in the time at my disposal to discuss the procedure by which Pasteur for all time settled the question of spontaneous generation and demonstrated that microscopic as well as macroscopic life is continuous, that the dictum of Harvey, *Omne vivum ex vivo,* is true, that the *Bacillus tuberculosis* can boast an unbroken ancestry through a longer time than any son of woman, and quite likely that the germs which cause a boil on the back of the neck today are the lineal descendants of those which fed upon the body of Job.

This monument, erected in front of the Pasteur Institute in Paris to commemorate Pasteur's successful vaccination against rabies, shows the shepherd boy Jean-Baptiste Jupille wrestling with the rabid dog that bit him while he was protecting some younger children. The boy was vaccinated six days later. He is now janitor of the Pasteur Institute, the man standing beside the monument.

Suffice it to say that the work of Pasteur, aided at that time by that of Tyndall, and confirmed by thousands of experiments now made each day in the laboratories of the world, has settled all these points. Pasteur had been growing in the belief that each infectious disease has its own specific germ or micro-organism, and to this, and to this only, the disease is due, and through this, and this only, is the disease distributed from man to man, from community to community, and even in the case of a pandemic, throughout the world.

Discovery of Causes of Diseases of Animals

About this time, Pasteur was chosen to go to southern France to study a disease which was so prevalent among the silkworms in that country and in northern Italy that the silk industry was threatened with extinction. Pasteur, when asked by Dumas to go on this trip, declared that he knew nothing about worms, but Dumas replied, "All the better; then you will have no preconceived ideas and will be guided by the results of your own work." This is one of the many illustrations which might be given that, while experience is a good teacher, it needs to be dominated by science. Pasteur did not find the solution of his new problem easy. In fact, he spent six years on it; but at last he discovered that the silkworms were suffering from two diseases; he was able to point out their causes, and how the diseases could be eradicated.

Pasteur's next big task was to investigate an outbreak of chicken cholera. He was soon able to demonstrate that this disease, highly fatal among fowls, is due to a bacterium. Here was opportunity to test an idea which had long been in his mind; would it be possible so to reduce the virulence of the chicken cholera bacillus that it might be used in a vaccine? He transplanted the cultures of this organism day after day through more than a hundred generations, and still he found that inoculation of a fowl with the hundredth generation was just as fatal as inoculation with the first. Fortunately, he and his assistants were called away from the laboratory for some weeks, during which time the cultures of chicken cholera bacillus stood without transplantation. When work was resumed, some of the old cultures were injected into chickens, and it was found that while these old growths caused brief illness they did not kill, and that after the fowls recovered inoculation with the virulent bacillus had no effect. Jenner had discovered vaccination against smallpox, but he had not isolated the virus, nor has it been done with certainty up to the present time. Pasteur, however, had discovered a vaccine for chicken cholera, and had the micro-organisms that caused this disease in pure culture and subject to whatever control experiment he might make.

For centuries anthrax had been a most destructive disease among domestic animals, especially among sheep and cattle throughout Europe. As early as 1837, a micro-organism had been found in the blood of animals dying from this disease. This bacterium had been studied and its causative relation to the disease demonstrated by Davaine and others. Pasteur inaugurated a line of experiments in order to determine whether the anthrax bacillus could be attenuated and made to serve the purpose of a vaccine. He succeeded in accomplishing this in two ways: 1. The organism was grown in the presence of an antiseptic, such as phenol (carbolic acid), strong enough to inhibit and modify its growth, but not strong enough to kill it. The cultures were grown at a temperature of 42 C., somewhat higher than that of the animal body. When this was done through several generations, the organism became so attenuated that it produced only a mild disease in animals from which they soon recovered, and after which they were wholly immune to virulent cultures. Probably the world has never seen so theatrical a demonstration of a scientific experiment as that by Pasteur and his assistants on vaccination for anthrax at Melun. Pasteur, convinced by experiments on laboratory animals that he had a certain vaccine for anthrax, and being continuously annoyed by criticism, offered to make a public demonstration. A flock of sheep and a herd of cows were placed at his disposal, and on a certain day there assembled at this farm a hundred or more persons, not only those interested in the work scientifically, but also those led by curiosity. Healthy sheep and healthy cows were vaccinated. At an appointed date the assembly again came together at this place; all the sheep and all the cows were inoculated with virulent cultures. Two days later the assembly was called again to see that, while every unvaccinated animal was dead or dying, there was no mortality among the vaccinated.

Monumental Work

The crowning work of Pasteur's life was his researches and great achievements in the prevention of rabies after the bite of a rabid animal. I do no more than mention this since a paper in a forthcoming issue of Hygeia is devoted to this work.

The achievements of Pasteur may be summed up in his ten great tasks: 1. He demonstrated that fermentation is due to living organisms. 2. He proved that there is a specific organism for each kind of fermentation. 3. He showed how bacterial contamination of wine and of beer may be prevented. 4. He divided living organisms acting as ferments into two distinct classes, those that thrive best in the presence of air, aerobes, and those that thrive best when air is partially or wholly excluded, anaerobes.

5. He placed the manufacture of wine, beer and vinegar on a scientific basis so that the manufacturers of the products were no longer compelled to trust to empiric and unreliable methods. 6. He saved the silk industry. 7. He produced a vaccine for chicken cholera. 8. He robbed anthrax of its most devastating powers by discovering the method of attenuating the virus and using it as a vaccine. 9. He conquered rouget, swine erysipelas, in the same manner that he had conquered anthrax. 10. He discovered the treatment for rabies, the crowning work of his life.

Pasteur was fortunate in the recognition which he received during his life. Every possible scientific honor of real worth was conferred upon him. He was voted a member of every important academy and society. After his silkworm work, the French government gave him an annuity of 12,000 francs. After the demonstration of his antirabic work, this annuity was increased to 25,000 francs. He lived to see the Pasteur Institute built by contributions which came from widely separated parts of the world, from emperors and kings, as well as from the poor. On his seventieth birthday, in 1892, he received an ovation which probably no other scientific man has received.

Inspiration of Personality and Work

In another and a perhaps more important and extraordinary way, Pasteur was fortunate. He was dearly beloved. Probably in the history of science no other man has had such devoted disciples. Many of the younger men absolutely effaced themselves in the service of their master. This certainly may be said of Roux, Chamberland, and Duclaux. His disciples bestowed upon him a degree of reverence which, without exaggeration, might be termed adoration.

Great as were the personal achievements of Pasteur, greater still were the possibilities they have opened up. Pasteur discovered the path that leads up the mountain of human progress. He pointed out the way by means of which the race might wholly free itself from the infectious diseases. He led the world high up this mountain path, preaching as he did, "Let peace be among you. Let science lead you. Under these conditions you may be able to reach the mountain peaks of human perfection." Under his guidance the world traveled far. In every land where his teachings were followed, morbidity and mortality rates fell, the average life was prolonged, greater freedom from illness was secured, higher intellect developed. Under his guidance we have reached the hills from which we may look down upon the pestilential marshes which we have left.

Having reached the limit permitted man to live, Pasteur laid himself down to rest. The world built for him a splendid mausoleum. For a few years after his death the race continued to progress under the leadership of the nations foremost in science; then came the great world cataclysm. The path being followed by the race toward the higher plateau has been broken. Across this path there are now chasms difficult to span. False teachers are urging the multitude to descend to the valley from which they came. They point out that the descent is easy: *Descensus averno facile est.* Many are following these false teachers; indeed, the descending crowds number not only hundreds and thousands, but millions. Russia, the country that gave the world a Mendeleff in chemistry and a Metchnikoff in biology, has already as a nation reached the marshes that lie below the hills. Asiatic cholera, confined to the mouth of the Ganges before the war, has for the last six years implanted itself along the Volga and its tributaries; from January 1 to August 17, 1922, official reports in Russia listed 55,000 cases of this disease. In 1921 there were millions of cases of typhus and relapsing fever, and in the same year, for the first time in the history of the world, malaria reached the arctic circle and was in evidence at Archangel. As a scientist, I fear that the near future of the race is by no means certain. False prophets were never more numerous, and credulity among the masses was never more evident.

It is fitting that we should do honor to the memory of a man who has done so much for the benefit of his race. The highest honor and the greatest homage that we can bestow on Pasteur or his spirit is to follow his teachings.

GREETINGS FROM HOLLAND

A recent issue of the Rotterdam *Courant* refers to the coming of Hygeia and expresses the wish that it may serve a useful purpose. A distinguished Dutch physician, who so far has kept his name concealed under a pseudonym, has done much to instruct his fellow citizens in public health matters by writing articles for the newspapers. A wise French philosopher, Descartes, said some centuries ago that medicine would prove a strong factor in the evolution of the race. This prophecy can be fulfilled only when the public understands and is ready to make application of the knowledge gained. The purpose of Hygeia is to establish a chain of communication between scientific medicine and the every-day life of the people. We hope that Hygeia will be so successful in this direction that similar journals will come into existence in all the countries of the world.

The House Fly—Carrier of Disease

L. O. HOWARD

WHEN we consider that the house fly may carry thirty distinct diseases and parasitic organisms, and that its occurrence in great numbers is due entirely to man and his actions, can we fail to marvel at man's utter and even criminal stupidity? The house fly is a domestic animal; its English name is appropriate; and the Latin name, *Musca domestica,* which Linnaeus gave it in 1758, conveys the right idea in this respect, for the species could barely exist away from what is called civilization. If Linnaeus, with prophetic vision of later discoveries, had named it *Musca horrida,* or *mortifera,* or *perniciosa,* or *funesta,* or *damnosa,* perhaps humanity would have begun to fight flies at an earlier date.

L. O. HOWARD, Ph.D., has been chief of the Bureau of Entomology, United States Department of Agriculture, since 1894. The insects in which he has been particularly interested are those which carry disease to man. He describes here the breeding places which man carelessly furnishes the house fly, the fly's development from the egg, and its mode of life, which is a menace to human health and life. He gives specific directions for the ways and means to rid ourselves of flies hatched and unhatched. Dr. Howard will write a series of papers for HYGEIA.

To persons living under ordinary conditions in the cities of the United States, it must seem that there are not so many house flies in the summer nowadays as there once were. That was my impression last summer, when I traveled from New York to Portland, to San Diego, and back to Washington during May and June, and in the autumn visited parts of Louisiana and Mississippi. I like to believe this, and that at least a part of this improved condition has been due to the antifly campaign, which was started more than twenty years ago. Undoubtedly this work has done much good, but I imagine that the rapid disappearance of horse stables, due to the substitution of the automobile for the horse, is responsible for the larger part of the present comparative freedom from flies, at least in cities. However, when we consider the methods of traffic management in many of our cities, it seems obvious that, while babies are not so liable to die from fly-borne infantile diarrhea as they were ten years ago, they are likely to live a few years longer only to be crushed by some horseless machine.

A Carrier of Typhoid

Many years ago I coined the term *typhoid fly,* which was adopted rather generally, and there is no doubt that, until the discovery and use of antityphoid inoculation, the house fly was very largely responsible for the carriage of that dangerous disease. This was undoubtedly true in the concentration army camps during the Spanish War, as was shown by Vaughan, Shakespeare, and Reed. It was equally true in the camps of the British troops during the Boer War a little later, as Austen and others showed. And it was always the case wherever large bodies of men were brought together in more or less temporary camps for large construction projects or for any other purpose.

The discovery of a successful means of inoculation against typhoid has done away with that danger in armies, however, and to some extent in cities, and a fly-borne epidemic of typhoid is not likely to recur, since its spread can be stopped easily by the health authorities of a given community by compulsory inoculation of the exposed population. During the last ten years there has been a marked and progressive diminution in the typhoid death rate. In 1911, there were 21 deaths from typhoid for each hundred thousand of population in the registration area, and in 1920 only 7.8; and the decrease in the country was almost equal to that in the cities. Among the colored population the death rate from this disease has always been much higher than among the white, and is so even today; in some of the larger cities of the South it is at least four times as great as among the white.

It appears from these statements that three agencies have been at work in the reduction of typhoid, namely, the growth of the practice of inoculation, replacement of horse stables by garages, especially in cities, and the gradual education in matters of clean surroundings—and in this educational movement must of course be included the tremendous effort that has been made to abolish the breeding places of the house fly.

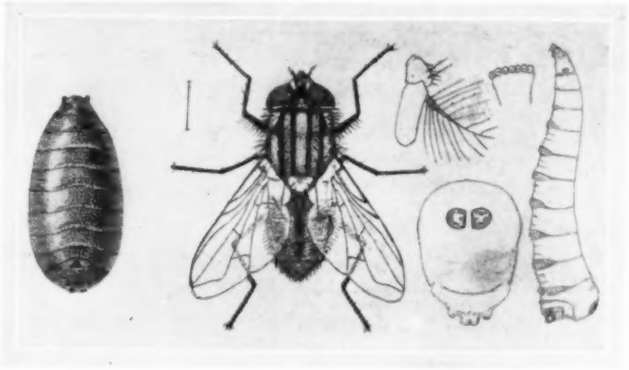
A Carrier of Other Diseases

The statistics of another fly-borne disease are interesting. The death rate from diarrhea and enteritis, inflammation of the intestine, among children less than two years of age, for the whole registration area, was progressively reduced between 1910 and 1920 from

100.8 to 44 for each hundred thousand. In cities in the registration states it was reduced from 118 to 52, and in rural districts from 77.3 to 35.1. Among persons of two years and older the reduction has been by no means so marked: for the entire registration area it has been reduced from 16.6 to 10.4; in the cities in this area from 14.6 to 9.8, and in the rural districts from 17.7 to 10.5.

In the reduction of diarrhea and enteritis only two of the three agencies mentioned have been at work, since a method of inoculation has not been discovered; perhaps this accounts for the lesser reduction of the death rate.

In the opening sentence it was stated that the house fly may carry thirty distinct diseases and parasitic organisms. It is probably unnecessary to elaborate this statement. But it should be mentioned that recent investigations by the Public Health Service have shown that the causative organism of amebic dysentery is to be found in the excreta of a large percentage of the people of the United States, even as far north as Washington, D. C. In ordinary health these people are resistant to the disease, but they are carriers, and in this carriage the house fly must play an important part. Moreover, we know that flies do carry and distribute the germs of tuberculosis, the germs of anthrax—a malignant pustule disease of animals that also occurs in man—and of other diseases, and the eggs of parasitic worms.



Evolution of the house fly: puparium at left; adult fly in center; larva, or maggot, at right.

In view of all this, I have been justified, I believe, in designating the house fly "the most dangerous animal that exists." It has undoubtedly carried death to more human beings than all the beasts of prey and poisonous reptiles put together. People should combine in a vigorous fight against this creature, which too long has been considered innocent and harmless. The so-called "swat the fly" campaigns, which have been inaugurated in various parts of the country by newspapers, have been worth while from an educational point of view; they have spread the news that the house fly is dangerous to such an extent that the knowledge is now almost universal; but beyond this the swat-the-fly campaigns have not done much good. The rational, in fact, the only rational way of meeting the problem is to abolish the breeding places. If this is not done, merely killing the adult flies will help but little. The places of those destroyed will be more than filled in no time at all.

The House Fly's Mode of Life

And now for a brief summary of the house fly's mode of life: It was once believed that most house flies breed in horse manure in the stables or in the manure piles, but it is now known that they breed in almost any fermenting organic matter. Great numbers breed in the primitive privies in the country and in small villages. They breed in the manure of other animals, such as pig manure; they have been shown to breed in considerable numbers in chicken dung—and there still remain many backyard poultry lots, especially in the smaller towns. A pig yard, by the way, was the sole source of an enormous supply of flies at one of the army camps in France during the summer of 1918. It may be well to state parenthetically that in that particular camp the majority of the soldiers were affected with dysentery, and when the outbreak of influenza came in the early autumn the hordes of flies undoubtedly spread this disease; they even clustered about the mouth of a patient whose influenza had turned to pneumonia. The flies breed also in garbage of all kinds, and the public dumps of cities as well as the garbage from houses are responsible for hosts of flies. With regard to garbage of all kinds, it should be remembered that this includes not only decaying vegetables and things of that sort, but also brewery waste, and even old cloth and paper when damp and fermenting.

The house fly multiplies very rapidly. The female begins laying eggs in from two and a half to twenty days after emerging, depending on the temperature. She lays from 120 to 150 eggs at a time, and in from eight to ten days after she lays the first lot she lays another batch; sometimes she lays still another batch or even a fourth, but usually not more than two. The characteristic maggots, larvae, hatch from these eggs in a few hours; they become full-grown, with plenty of food and in very warm weather, in three days. The full-grown maggots are very active, and move about from place to place in the food mass, manure, and invariably finally migrate to the bottom or to the sides. Usually, it is from four to seven days before they migrate, and in their new location turn to pupae.

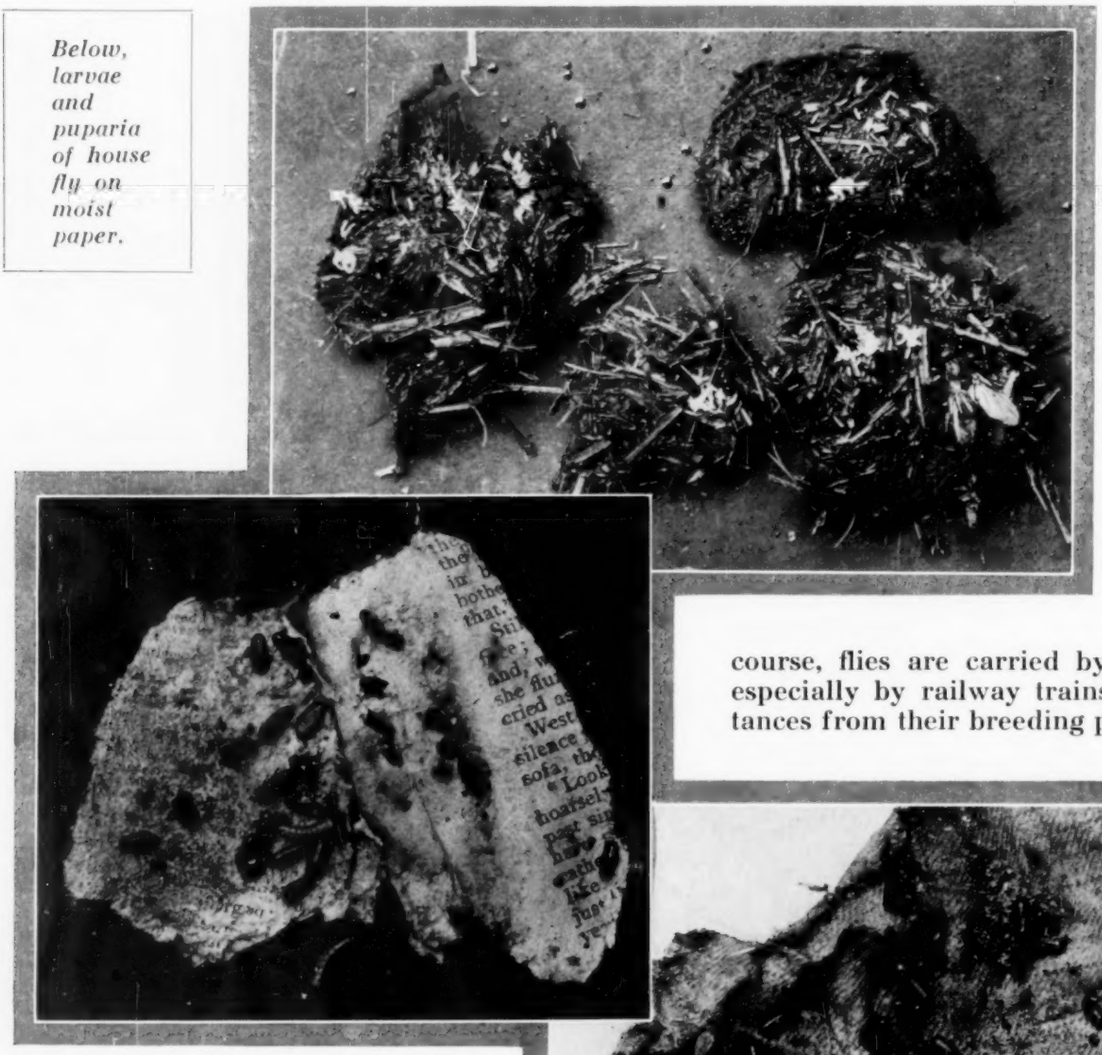
This migrating habit of the larvae before they transform to puparia, the intermediate, quiescent stage between the maggot and the adult fly, is interesting and important, and on

this migration depend some of the remedial measures.

From the puparium, which is a small, oval, brownish body, the adult fly issues after from three to six days. The fly does not grow after issuing, but many persons seem still to have the idea that small flies are the young of large flies. When the adult female fly issues from the puparium she does not immediately lay eggs; a certain time is required before she is sexually mature. In previous publications I have stated that the length of this period is a week or more, but in the south it may be considerably less—as short, in fact, as two and a half days—and in other localities and under other conditions it may extend to twenty days, depending to a large extent on temperature, the character and abundance of food, and the humidity.

The statement is generally made that flies usually remain near their breeding places if they have plenty of food, but experiments lately made show that they may migrate considerable distances. The maximum distance accurately determined by Bishopp in his experiments at Dallas, Texas, was thirteen miles, and this without aid from vehicles of any sort. Of course, flies are carried by vehicles, and especially by railway trains, to great distances from their breeding places. In general, however, abolishing an extensive breeding place will have its immediate and striking effect on the abundance of flies in the neighborhood.

Below, larvae and puparia of house fly on moist paper.



Egg masses of the house fly on manure.

Larvae and pupae of house fly on rotting cloth.

And now as to the number of generations. Flies begin to breed in the spring, as soon as the days begin to be consistently and consecutively warm, and continue to breed until well

Chasing the fly, a primitive means of lessening the inconvenience, but not the danger from the fly.

into the autumn. Even in midwinter in the southern states flies may lay eggs, and during warm periods adults may issue and become fairly troublesome. Under summer conditions in the more temperate regions of the north, from eight to ten days is the usual duration of a generation, that is, from the egg to the adult fly; and from three to five days should be added for the period between the time when the flies issue and when they begin to lay eggs (this is known as the preoviposition period): This allows for a very rapid succession of generations, and the flies therefore, when undisturbed, will increase in almost geometrical ratio from spring until autumn.

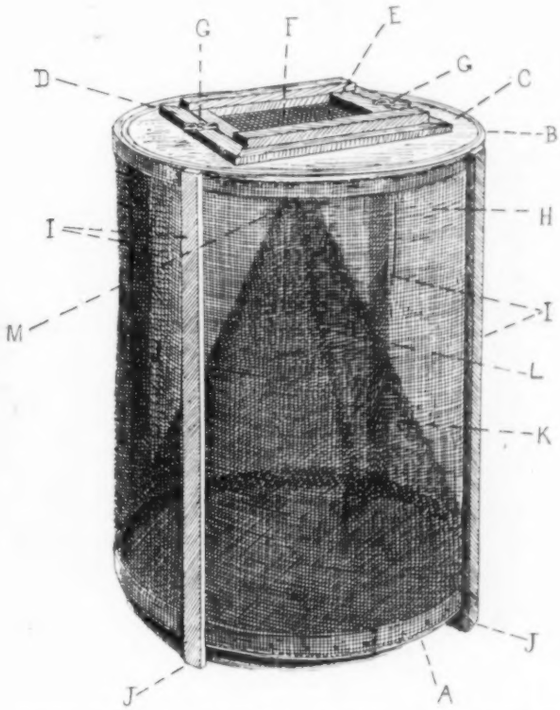
The question as to how the fly passes the winter has been greatly debated. From the latest news, it seems that the old idea that it passes the winter in the adult stage is erroneous; rather recent experiments carried out at Bethesda, Maryland, and Dallas and Uvalde, Texas, show that the winter may be passed in the larval and pupal stages. The local city government of London, England, started some years ago an interesting series of experiments in this direction, and failed, after two or more years, to find a single overwintering adult house fly. In view of these facts, it is interesting to note that just as I am writing this article I find a notice of a paper by a Japanese author asserting that in Korea he has shown that the house fly, both male and female, survives the winter in the adult stage. How to account for this extraordinary discrepancy of observation is beyond me.

Prevention and Extermination

This is not the place for a complete treatise on the house fly. Ten years or more ago I wrote a 300-page book about it, and by no means said all that there was to be said. Neither should I give here a long consideration of the subject of remedies, since nearly every state board of health has issued a house fly bulletin, and the Department of Agriculture at Washington has published several bulletins, the best of which will be sent to any applicant.

But the point must be made that the principal effort to control this dangerous species must be made at the source of supply—its breeding places. Absolute cleanliness and the removal or destruction of anything in which flies may breed are essential; and this is something that can be done even in cities. Perhaps it can be done more easily in the cities than in villages, on account of their greater police power and the lesser insistence on the rights of the individual. Once people are educated to the danger and learn to find the breeding places, the rest will be easy.

In spite of what has just been said, it is often necessary to catch the adult flies, and for this purpose good traps may be bought, and even more efficient ones may be made by hand. The accompanying illustration shows a hand-made trap; it might be well to extend the side laths of this trap so that it stands on legs about one and one-half inches high. If it stands much higher than this, it will not catch the flies very successfully. Full details concerning its construction are given in Farmers' Bulletin 734



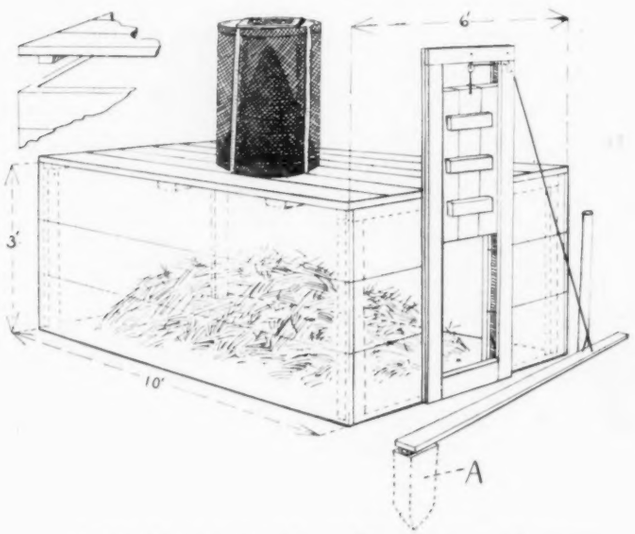
Home made trap for house flies: A, hoops forming frame at bottom; B, hoops forming frame at top; C, top of trap made of barrel head; D, strips around door; E, door frame; F, screen on door; G, buttons holding door; H, screen on outside of trap; I, strips on side of trap between hoops; J, tips of these strips projecting to form legs; K, cone; L, united edges of screen forming cone; M, aperture at apex of cone.

of the United States Department of Agriculture. The best bait for such traps is one part of black-strap molasses to three parts of water; decaying bananas and other fruits, especially with the addition of milk, may be used.

The Manure Platform

The Department of Agriculture has had a great deal to say in its publications about the manure platform. It is fully described in the farmers' bulletins of the department, and is an excellent arrangement for country use. If the farmer or the owner of an estate has a stable in which he keeps a number of horses, the use of the manure platform will automatically prevent the breeding of large numbers of flies, since the maggots migrating to the bottom of the pile will fall through the cleats of the platform into the cement base, where they will perish. But there is much to be said of the desirability of placing manure in fly-proof receptacles as soon as possible after it is dropped. Mr. F. C. Bishopp of Dallas, Texas, one of our foremost fly experts, is candidly of the opinion that a concrete manure bin provided with an effective fly trap is better adapted to conditions on the ordinary farm or in small towns than the manure platform. It is an excellent plan to spread the manure. In many dairies in various parts of the country, and even on farms which are equipped with manure spreaders, the manure is distributed on the fields periodically, even daily.

Manure platform to prevent the breeding of house flies; the larvae migrate to the bottom of the pile, where they fall through onto the cement base below.



A good manure bin with fly trap above

Treating the Manure Pile

For the treatment of the manure pile—and there are many persons who insist on keeping the manure in piles in order that it may become properly rotted, and from which it may be taken from time to time as it is needed for successive crops—there seems to be nothing better than borax or hellebore. If powdered borax is used weekly at the rate of three fifths of a pound to eight bushels of manure, it will kill the fly maggots and apparently not appreciably injure the value of the manure for fertilizing purposes.

But the question of the disposal of other refuse remains; in other words, the disposal of garbage. It has been shown by several towns with a population of from 10,000 to 15,000 and more that the burning of garbage is feasible and satisfactory if the proper type of incinerator is secured. In cities where the garbage is sold to hog feeders, the sanitary conditions about the feeding yards should, by all means, be controlled.

The Chicken Yard

As to chicken yards, it is undoubtedly true that flies will breed in rather small accumulations of chicken manure on the dropping boards, but in greater numbers when the droppings are on the ground. The weekly cleaning of chicken houses or yards is necessary to prevent fly breeding.

It may be well to add a word about fly screens. Some durability tests have been made with the various screens, and it has been found that black, or painted, wire gives good satisfaction in the arid sections of the country. For the moderately moist climates the best grades of galvanized wire are fairly good; but for all humid regions, especially if near the coast, bronze wire or monel metal wire is the least expensive in the long run. Screening is especially mentioned, since it is important to screen food supplies in fly-infested markets and shops or wherever food is dispensed.

"PATENT MEDICINES"

I. What Is a "Patent Medicine" and Why?

ARTHUR J. CRAMP

THERE are practically no patent medicines. To begin this series of articles with such a statement may seem paradoxical; yet, essentially, it is a fact. That is the reason the phrase "patent medicine" is put in quotation marks. A real patent medicine is a product on which the United States Patent Office has granted a patent. Before Uncle Sam can be persuaded to issue a patent it is necessary to convince him that the article for which a patent is sought is both *new* and *useful*. And this requirement, in itself, prevents practically all so-called "patent medicines" from being patentable!

That vast flood of remedies which, colloquially, we call "patent medicines" are, for the most part, simple mixtures of well-known drugs, drugs that are—or have been—in daily use by physicians. The phrase "or have been" is used advisedly, for it is not unusual for "patent medicine" manufacturers to resurrect an herb long since tried and found wanting and discarded by physicians. This obsolete drug they add to their concoctions in order to invest them with that air of mystery that is so essential to the successful merchandising of "patent medicines." Naturally, such simple mixtures being neither "new" nor "useful" cannot fulfil the conditions required for the issuing of a patent.

But if modern "patent medicines," from their very nature, are not patentable, there is a more eloquent, if less obvious, reason for their not being patented. The "patent medicine" maker would not, under modern conditions, patent his product even if he could. "Patent" means "open to public perusal," and this is the last thing the average "patent medicine" maker wants. Mystery and secrecy are his most cherished assets.

Mrs. Stephens' Cure

For an illustration of the old adage that the unknown is always awe inspiring, let us digress a moment. Nearly two hundred years ago (about 1738), Mrs. Joanna Stephens of England claimed to have discovered a certain and unfailing cure for "gravel and stone in the bladder and kidneys." Not only did she delude the general public, but also she was able to deceive some doctors into a belief in her discovery. One well-known physician of the time even claimed that he had been cured by Mrs. Stephens' remedy, and he collected and published reports of more than one hundred other "cures" to show its value! Mrs. Stephens was urged to make public the secret of her boon to suffering humanity. Quack-like, she refused, but offered to give up the formula for five thousand pounds ($25,000), in those days a comfortable fortune. A public fund was established and an attempt was made to raise the amount by subscription. Only about thirteen hundred pounds was forthcoming, so Parliament was petitioned to make a grant. Finally, Mrs. Stephens got her price, and the public got her "formula" which was duly published in the London *Gazette*. What was it? Hips and haws, ash-keys, swine-cress, and a number of other vegetables, with egg shells and snails (shells and all) burned to a cinder and the ashes mixed with camomile flowers, fennel, and similar "yarbs," And then? With the mystery and secrecy of the nostrum gone, the public lost interest, the cure rapidly fell into disrepute, and finally into oblivion. And the learned medico who vouched for the remedy? He died of the disease of which he had believed himself cured by Mrs. Stephens' mixture.

ARTHUR J. CRAMP, M.D., is director of the Bureau of Investigation of the American Medical Association; he is kept busy uncovering fads and frauds foisted on the public by unscrupulous exploiters. This paper begins a series on the uselessness or harmfulness of many of the proprietary home remedies, the so-called patent medicines.

Secrecy and Mystery

Take away, then, the secrecy and mystery surrounding a "patent medicine" and you have destroyed the manufacturer's most cherished possession. But a medicine cannot be patented without this secrecy being destroyed, for in patenting it the composition and method of preparation become matters of public record, the details of which may be obtained for a

few cents from the Patent Office at Washington. Here, then, is the chief reason why the modern dispenser of pills and potions would not patent his products even if he could. And there is yet another reason. A patent gives the person to whom it is granted (the patentee) a monopoly on the patented article for seventeen years only. During this period no one else may, legally, make and sell the product except by permission of the patentee. After seventeen years has elapsed, the product becomes public property and any one may make and sell it.

The Case of Castoria

There is on the market today a "patent medicine" that was once a patent medicine. It is known as "Castoria." In 1868, Dr. Samuel Pitcher applied for, and was granted, a patent on what he termed an improved medicine to be used as a cathartic or substitute for castor oil. It was simply a preparation of a syrup of senna with aromatics and some alkaline salts which were specified in the patent, with a process for extracting the senna with hot water containing a little baking soda. There was nothing new in the extraction of senna with a weak alkali to make a preparation which, while active, did not possess griping qualities; it had been done long before Dr. Pitcher was granted his patent. But in those days the Patent Office was not very discriminating. Today it would probably not be possible to get a patent on anything so lacking in the essentials that constitute patentability.

In due time, the patent on "Castoria," expired by limitation and other concerns began manufacturing it. This led to law-suits. But the United States Supreme Court finally held that, as the name "Castoria" was the only one by which the article was known, the *name* as well as the *product*, had become public property on the expiration of the patent. Today, then, any one may make "Castoria," although, of course, he may not legally imitate the design, style, or signature of the original package. Hence the strenuous efforts on the part of the original manufacturers to familiarize the public with the trade package.

Perpetual Monopoly by Trade-Mark

But, as already pointed out, if the modern maker of medicines for home consumption has not a product that can be patented, neither has he any desire to patent his product if he could. The modern maker of medicines has found a better way of protecting his commercial interests than by means of the limited monopoly granted by a patent—a way that does not require him to lay his cards on the table, so to speak, and tell the public just what is in his preparation. What he does is to give his mixture of drugs a fanciful name and then register that name as a trade-mark! A trade-mark is good for twenty years and can be renewed indefinitely, thus becoming, essentially, a perpetual monopoly. In granting a trade-mark the government does not require information regarding the composition of the *thing* to which the *name* is applied. The product may and frequently does change in composition but the *name*, like Tennyson's brook, goes on forever.

Changing the Thing but Not the Name

To illustrate the way in which these trade-marked remedies may—unknown to the purchasing public—vary in composition while the name remains constant, a few examples may be cited: When the trade-mark was first granted on the name "Winslow's Soothing Syrup" that product belonged to the "baby killer" type of nostrum, with morphine and alcohol as its most powerful ingredients. As the years went by, public opinion became aroused to the dangers of such mixtures and many reputable drug stores refused to carry the preparation. Then the makers took out the morphine and still later the alcohol. Today the name "Winslow's Soothing Syrup" stands for a combination of simple laxatives and carminatives that but remotely resembles the original wicked mixture.

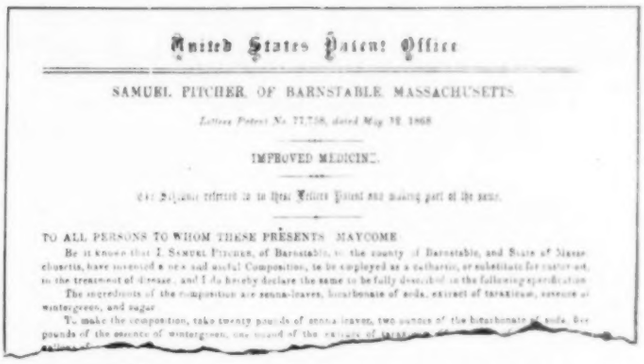
NET CONTENTS 3 FLDOZS.
PITCHER'S CASTORIA
GENUINE BABY BRAND
(TRADE MARK)
Contains no Opium, Alcohol, Morphine or other narcotics
Useful in Constipation and Flatulent Colic in Infants and Children
A much used preparation for regulating the bowels of infants and children
Often useful in sour stomach
It aids nature in keeping children healthy
No. 576
PFEIFFER CHEMICAL COMPANY
OFFICES
NEW YORK ST. LOUIS
PITCHER
CASTORIA
ALCOHOL 3%
CROWN BRAND
THE KIND CHILDREN WILL TAKE
TRADE MARK
A Purely Vegetable Preparation and A Perfect Remedy for Constipation, Sour Stomach Diarrhoea and Worms.
INDUCES NATURAL SLEEP TO
INFANTS and CHILDREN
Guaranteed to contain Neither Opium, Morphine nor Mineral
This Formula is compounded with greatest of skill and care.
LAUBER & LAUBER CO.
INCORPORATED
CHICAGO, U. S. A.
PRICE 35 CENTS
900 DROPS
CASTORIA
ALCOHOL - 3 PER CENT
A Vegetable Preparation for Assimilating the Food by Regulating the Stomachs and Bowels of
INFANTS CHILDREN
Thereby Promoting Digestion Cheerfulness and Rest Contains neither Opium, Morphine nor Mineral. NOT NARCOTIC
A helpful Remedy for Constipation and Diarrhoea, and Feverishness and LOSS OF SLEEP resulting therefrom in Infancy.
Fac Simile Signature of
THE CENTAUR COMPANY
NEW YORK.
At 6 months old
35 DOSES - 40 CENTS
THE CARLING
PITCHER'S
CASTORIA
CONTAINS ALCOHOL ½ OF 1%
The Carling Chemical Co.
Incorporated
Manufacturing Chemists
CHICAGO
The Popular Prescription FOR
Infants and Children
Trade C. C. C. Mark
An Unequaled Remedy for
Diarrhoea, Constipation, Sour Stomach, Feverishness, Convulsions, Sleeplessness.
Contains no MERCURY, MORPHINE, OPIUM or other narcotics.
PRICE 35 CENTS

Castoria is no longer a proprietary name. When the patent on the product expired, the name, with the product, became common property. Any one today may make and sell Castoria. Here are photographic reproductions, reduced, of the packages of a few of the many brands of Castoria now on the market.

Some years ago a mixture of acetanilid, caffeine, citric acid, and baking soda was marketed under the name "Antikamnia." Neither the physician nor the public was told what was in the stuff. The exploiters would not admit that Antikamnia contained acetanilid. Then came the "Pure Food Law" (National Food and Drugs Act) which required, among other things, the declaration on the label of the presence and amount of acetanilid! What did the manufacturers do? Rather than admit that the charges against them were true they substituted acetphenetidin (phenacetin) for acetanilid. Years later came the Great War and the price of acetphenetidin soared. Presto change! The old, cheap acetanilid replaced acetphenetidin! But through all these changes of composition the *name* remained ever the same.

And again: Some years ago a "patent medicine" of the "booze" type was put on the market under the name "Peruna." It contained 28 per cent. of alcohol and some bitters. Great were the sales in the "dry" territory of those days. So flagrant became the abuse of this wretched concoction that the United States, through the Office of Indian Affairs, first prohibited its sale to the Indians and later, through the Internal Revenue Department, notified the manufacturers that unless some drugs were put in the mixture "Peruna" would be subject to the restrictions governing the sale of alcoholic liquors. So the manufacturer added senna to his concoction and cut the alcohol from 28 per cent. to 20 per cent. The *name* went on its placid way unchanged, and the "Peruna" devotees of that day must have experienced a sad shock on imbibing for the first time the newly medicated mixture. As public opinion changed on the subject of alcohol, the composition of Peruna again was modified and today it contains 12 per cent. of alcohol.

One more of scores of examples may be given: For years an alcoholic nostrum (alcohol 14 per cent.) was sold to those who had, or thought they had, kidney disease, under the name "Warner's Safe Cure." Then came the Eighteenth Amendment with the Volstead Act and the alcohol, the most potent drug in the Warner preparation, disappeared entirely and glycerin was substituted.



United States Patent Office.

SAMUEL PITCHER, OF BARNSTABLE, MASSACHUSETTS.

Letters Patent No. 77,736, dated May 12, 1868.

IMPROVED MEDICINE.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL PERSONS TO WHOM THESE PRESENTS MAY COME:

Be it known that I, SAMUEL PITCHER, of Barnstable, in the county of Barnstable, and State of Massachusetts, have invented a new and useful Composition, to be employed as a cathartic, or substitute for castor-oil, in the treatment of disease; and I do hereby declare the same to be fully described in the following specification.

The ingredients of the composition are senna-leaves, bicarbonate of soda, extract of taraxicum, essence of wintergreen, and sugar.

To make the composition, take twenty pounds of senna-leaves, two ounces of the bicarbonate of soda, five pounds of the essence of wintergreen, one pound of the extract of taraxicum, [illegible]

Photographic reproduction (greatly reduced) of the opening paragraphs of the patent specifications for the original Castoria.

Buying Names, Not Things

The property value of a "patent medicine" lies in the *name*. Does the price of one ingredient go up? Substitute a cheaper! Do the state or federal laws prove irksome because of the composition of a nostrum? Change the composition! It is well recognized among the "patent medicine" fraternity that the *name* is all-important and the *product* an incident. Some months ago a concern advertised in a journal devoted to "patent medicine" interests that it had a *name* for sale; not a *thing;* the thing could be formulated at one's leisure. In buying what we call "patent medicines," we are buying *names* not *things!*

[The second article of this series, to appear in HYGEIA for May, will deal with the relation of the National Food and Drugs Act ("Pure Food Law") to the "patent medicine" industry]

WRITTEN IN 1783, BUT STILL TRUE

"No laws will ever be able to prevent quackery, while people believe that the quack is as honest a man, and as well qualified, as the physician. A very small degree of medical knowledge, however, would be sufficient to break this spell; and nothing else can effectually undeceive them. It is the ignorance and credulity of the multitude, with regard to medicine, which renders them such an easy prey to every one who has the hardiness to attack them on this quarter. Nor can the evil be remedied by any other means but making them wiser. The most effectual way to destroy quackery in any art or science is to diffuse the knowledge of it among mankind."—William Buchan, F.R.C.P. (Edin.), 1783.

First Aid to Medical Terms

WATSON DAVIS

THE pages of a medical book or magazine have a foreign look to those who do not usually read them. Long names and odd words bewilder and confuse. But the terminology of modern medical writings cannot be compared to the unintelligible incantations of witches, wizards, and medicine men of the past or even of their pseudomedical successors. The nomenclature of scientific medicine, like science itself, arose through the process of evolution. Words have history and meanings.

"Oxycephaly" was not invented to be the butt of a joke or the subject of a comic picture. It is the name of a deformity of the bones of the head. "Oxy" is the English form of the Greek prefix meaning sharp; "cephaly" means head, and is derived from the Greek by way of the Latin. The common name of oxycephaly is towerhead or steeplehead, and that is just what the technical term means. Those affected by this trouble have foreheads of great height, and though they look queer they are not so in mind.

WATSON DAVIS is news editor of Science Service, Washington, D. C. Mr. Davis traces the history of medical terms which sometimes seem ridiculous or affectedly long, and vindicates them by pointing out that each of their component parts has a meaning.

Evidence of the ancient tongues, Latin and Greek, can be found in medical terms more often than in our every day language, although many of the syllables that we use are memorials to those Mediterranean peoples who created much of our social evolutionary past. In the dark ages that followed the fall of Rome and preceded the use of printing, Latin, with its background of Greek, was a universal language. Disease was also universal at the time, and it is natural that many of the descriptive names by which these misfortunes were known should continue to be associated with them to this day. Printing, with its resulting fertility of knowledge and progress, resulted in the literary fall of Rome for it allowed education to spread and individual languages to arise. Information could then be broadcasted and inherited through the country's own tongue. Latin lived for many years through the agency of the diplomacy and science of those days, but finally the basic words and phrases of the dying Latin language became involved with the newer and more national tongues. The mother tongue lost its universality, yet its foundation still serves the world.

Today the physician writes prescriptions in Latin. He has historic and practical reasons for doing so. Mystification of the patient usually is not one of these. He uses the words that every pharmacist knows. Even today a prescription written in Latin may be filled in any civilized country on the globe.

The goddess whose appellation looks down on this page inspired the ancient Greek to better health. Her name, handed down through the centuries, has given rise to the words concerning health and its preservation. And the purpose of this magazine is probably more quickly understood in a foreign land under its present patronage and name than if it had been christened with the hale Anglo-Saxon name of Health.

The unpleasant and disastrous side of medicine also extends into the past of words. Epidemics have inflicted themselves upon the people. That is just what the word, epidemic, means. "Epi" is Greek for upon, and the common people of the ancient Greek state were known as the "demos," a term that is often used for the populace of today.

In one of those new psychologic tests in which the subject must give quickly the first word that is suggested in his mind by a given word, the usual response to "epidemic" would now probably be "influenza." The classical Latin student delving into the past history of this word would exclaim: "Easy! 'In' meant in Latin just what it does now, the rest of the word came from 'fluo,' to flow. It was so named because it is a disease that flows in upon the people, engulfing them like a flood." The ordinary person might sheepishly concoct a play on words by answering: "Well, it certainly influenced me a few years ago."

They would both be partially right and wrong at the same time. Epidemics of influenza were known many years ago, and, as in the case of many misfortunes, the heavens were blamed. It happens that the Italians of the seventeenth century ascribed this epidemic to the influence of the stars and therefore named it "influenza." More graphic in the English is "la grippe," the French name that was given the disease about a hundred years later. Today we call mild attacks of troubles like influenza, the grip.

Few of us will forget the influenza waves of 1918 to 1919 which caused heavy loss of life. Such widespread prevalence is known as a

pandemic. Since "pan" is the Greek combining form for all, this word is simply a short-cut to saying that it affects practically all the people. When a disease lies more or less dormant for a period, picking only a few victims, as many authorities believe influenza does in its off years, the state of the disease is called endemic, meaning that it is among the people.

Research has not yet been able to locate definitely to the satisfaction of all the cause of influenza. If the guilty organism had been discovered, we might be calling it by some name that does not reflect astrological superstition.

[The meaning and interesting pasts of other medical terms will be presented next month.]

The New Sign-Post on the Highway to Health

LENNA L. MEANES

WHEN the thoughts of a people turn to a common cause the wise man takes heed. For the last dozen or more years the signs of the times have pointed toward a convergence of thought on health—health in the positive degree. There was a time when nobody even thought in terms of health; pain or fear of pain drove a person to the nearest physician for relief; he became a patient, and there his responsibility ended. In fact, health merely meant not being sick abed and was purely a personal matter.

Gradually the age-old, half-accepted, half-rejected idea that an ounce of prevention is better than a pound of cure began to come into its own. It came fully into its own when Louis Pasteur, only a little more than half a century ago, revolutionized the medical world with the discoveries which put the seal of scientific approval on preventive medicine. The physician found himself armed with the facts to fight contagious and infectious diseases. But that fight involved the interests of physican, patient, and community, and cooperation of the three was absolutely essential to victory. National, state, and local health authorities found growing support for their demands, voluntary health organizations developed, and health committees were formed in innumerable leagues and clubs. A community consciousness of the benefits of well-being began to develop, but while the idea of health had advanced from that of curing disease to preventing disease, health was not yet thought of as separate and apart from contagion and suffering. In fact, health, instead of being a gloriously vital characteristic of our national life was still a limping negative thing, considered chiefly when fear or pain brought it forcibly to mind. A person knew how sick he was—or rather how sick his physician said he was— because he had sinned against the laws of sanitation or of prevention of disease, but no one knew how well he might be.

Curious as it may seem, the average person did not consider his health assets seriously until the draft examination for the World War brought the appalling revelation of the physical and mental status of the young men of America. Most of us still carry around with us the depressing statistics of that dark period, but fail to rejoice over the results of the following months, when, through regular habits of eating and sleeping, exercises suited to the individual needs and a fair amount of recreation, a surprising number of the unfit were made fit, health assets were made to overbalance liabilities, and many men knew for the first time what "top notch" joy in living might be.

Many physicians, however, and other persons particularly interested in health, did take stock of this, just as they had taken stock of the constructive health work being done for the children of the land. The present widespread program for child welfare in this country had its impetus through a revelation of the similarly appalling preventable waste in child life. The child welfare movement, in its influence on the mental attitude toward health of the fathers and mothers of the country, as well as on the consciousness of the child, and the training camps, in their influence on the physical well being of the American soldier, have raised two irresistibly arresting sign-posts for

LENNA L. MEANES, M.D., became medical director of the Women's Foundation for Health upon its organization in 1919. She had been identified with public health work for a decade before that. Recently she was appointed to represent the women's organizations of the country on a committee named by the Council on Health and Public Instruction of the American Medical Association. Dr. Meanes presents here an outline of the work which the Women's Foundation for Health has accomplished so far and the far-reaching work which it has set for itself in emphasizing the public's need of positive health.

Martha Tracy, M.D., President of the Women's Foundation for Health, Inc.; Dean, Woman's Medical College, Philadelphia.

the public, sign-posts bearing not the old legend "Danger," but the promise "Health," positive health.

Organization of Women for Health

While many were merely glimpsing these signs, the women of America saw the trend of progress and took action. It will be remembered that women were the pioneers in the child welfare movement as early as 1910, when the baby contests sprang up all over the country; through voluntary organizations and a few leading pediatricians they developed these contests into conferences; awakened public opinion to establish the Federal Children's Bureau and child welfare divisions in state boards of public health; aroused the interest of the medical profession and through them secured an official score card and a set of child welfare pamphlets from the American Medical Association, and interested the local physician to cooperate. Conditions have changed; Dr. John M. Dodson says, in his article, Preventive Medicine and the General Practitioner, in *The Journal of the American Medical Association* for January 6, 1923:

> Many of the men engaged in pediatric work now secure a very considerable portion of their incomes from fees paid by mothers for advice in the care of their healthy, normal infants. The frequency with which such visits to the physician are made, at which the weighing and measuring of the child constitutes an impressive demonstration, varies, of course, with the zeal of the mother, the condition of the child and the judgment of the physician.

The child welfare movement was well on its feet by 1916, when the demand for organized effort in sustaining and increasing the physical, mental and moral health of our people came as a war measure. Through the Training Camp, the National Council of Defense, the Red Cross, the Child Welfare Organization and all the other activities of those tense days, women steadily increased their knowledge of public welfare and their efficiency to carry on team work. No group of our national life was more sensitive to the reproach implied in the statistics of the draft examination. When, therefore, the Department of War decided to launch a health campaign among women and girls at the same time that it was educating and training the 4,000,000 men of the army, the women were ready to respond. Because of its health program for women, the Bureau of Social Education of the National Board of the Young Women's Christian Association was asked by the War Department to conduct this work. This campaign, which started with the specific purpose of informing women concerning social disease, developed into an all-round educational program on health, a program which so held the interest of medical and club women that it was made a permanent feature of our social development.

Accordingly, representative medical women of Europe, Great Britain, Japan, China, South America, and the United States were brought together in an international conference in the autumn of 1919. In the three concluding days of the conference, leading women from fourteen of the largest women's organizations of our country met to discuss the possibility of a cooperative interpretation of a program on health for women and girls. At the end of these three days the Women's Foundation for Health emerged, a proof of the ability of women to move swiftly as an intelligent force. They announced themselves a cooperative body of leading women's organizations "formed with the purpose of correlating the health activities of the various organizations in a program emphasizing the positive phase of health." It is thus evident that the Foundation is not in any sense an independent organization; it exists only to unify active policies and to develop latent projects relating to health, beginning where curative and preventive measures end, and building toward the ideal physical and mental strength. The women who conceived and developed this organization realize, from their years of experience in public welfare, the value of the work done and being done by national, state, and local

medical associations and boards of health and voluntary health organizations. The policy of the Foundation, set forth in 1919, is therefore strictly adhered to; the Foundation offers its services through its cooperating members in all organized health activities of the country when the demand arises for emphasizing "health plus"; it does not in any way interrupt any program which an organization is already following.

Almost three years elapsed between the drawing up of the plans of the Foundation and the establishment in July, 1922, of the staff and headquarters in New York City. During those three years the women who formulated those plans worked against great odds independently, or through organizations whose generosity made possible certain progress otherwise impossible. One of the most important results of those years is the Positive Health Series, a common text to be used in interpreting the Foundation's program, prepared in cooperation with the Bureau of Social Education of the National Board of the Young Women's Christian Association, and the Council on Health and Public Instruction of the American Medical Association. This came off the press of the American Medical Association in August, 1922, and the demand for it has justified the vision and generosity of the contributors. Also, during those years a physical examination was given to several thousand women who considered themselves well. These examinations brought forth some startling facts which confirmed the belief of those interested in the Foundation. Approximately 10 per cent. of these women were found to possess "health plus"; about the same proportion were discovered to be really in need of a physician's or surgeon's services; while between these extremes the great mass—approximately 80 per cent.—were suffering from complaints which in a large majority of cases were the result, not of disease, but of faulty health habits, lack of information, and maladjustment to living conditions.

This study served to intensify the Foundation's purpose of emphasizing the positive phase of health. Naturally, the first step for accomplishing such a purpose is an understanding of the term positive health. The next step is bound to be the individual's demand for a physical examination to check up assets and liabilities, followed by an attempt to establish correct daily habits, exercise and recreation suited to the individual needs, adjustment to home and to working conditions, and periodic examinations to mark improvement. The women who assume this responsibility not only enjoy increased well-being, but also have the satisfaction of having contributed to the sum total of community health; for it is

Mrs. James S. Cushman, First President of the Women's Foundation for Health.

self-evident that the increase in the number of those in any community who have a correct conception of health must decrease the rate of disease and death in that community. With this double aim in view, "Grade A health" for the individual and a general betterment of the community, the Women's Foundation for Health announced its program as follows:

OBJECTIVES

I

To establish the conviction that health is generally attainable through individual effort and responsibility.

II

To establish the conviction that mental health is as procurable as physical health.

PROGRAM

A. For realization of Objective I

1. Promotion of the positive viewpoint toward health education and the individual's assumption of her own responsibility.
2. Effort to secure, generally, health examinations:
   a. First, for inventory of individual needs and advice concerning daily health habits, exercise, and recreation to meet those needs.
   b. Later, at periodic intervals, for checking improvement and further advice for development.

3. Promotion of education in the health values of food.
4. Dissemination of adequate knowledge of the heritage of life.
5. Effort to secure proportionate emphasis on the adaptation of recreation to the individual needs.
6. Campaigns on
   a. Better air—better health
   b. Better food—better health
   c. Better teeth—better health
   d. Correct posture—better health
   e. Better feet—better health
      1. Good shoes—better feet, better health.
      2. Straight foot walking—better feet, better health.
   f. Etc., etc.

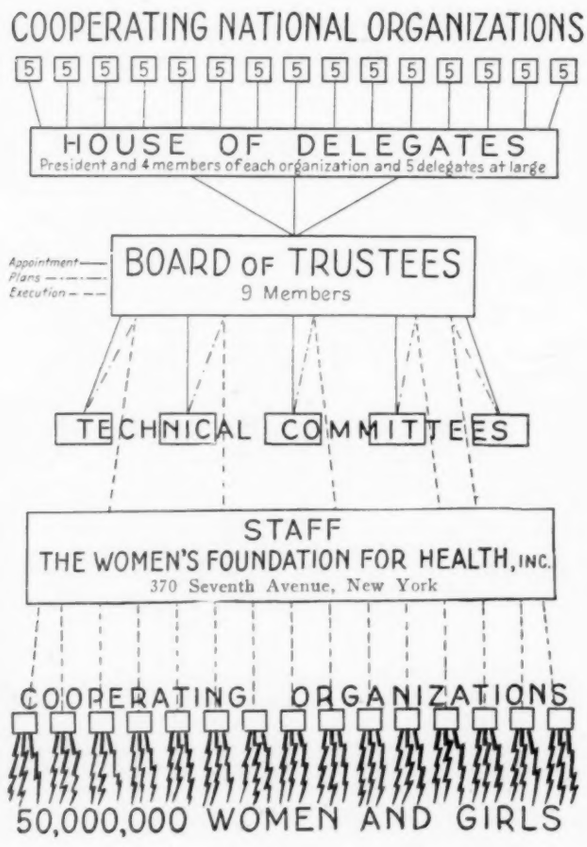
B. For realization of Objective II:

1. Effort to secure on the part of the individual correct mental habits.
2. Effort to secure realization of the necessity of adjustment of work, living conditions, and recreation to the individual's physical and mental capacity.

Can these objectives be attained? The sincere response the Foundation has had to its educational program since last July allows the answer, "Yes, and quite as rapidly as the child welfare program was realized." As a people we are more responsive to the stimulus of hope than of fear; we are now turning from the dread of disease to the promise of health—increased enjoyment and usefulness. Naturally, the Foundation expected cooperation from the organizations making up its constituency; cooperation from other groups later was hoped for; but, already, the several national health organizations and a number of state boards of health have expressed their desire to further the aims of the Foundation.

This cooperation is greatly increasing the public understanding of positive health. That understanding is bound to result immediately in a demand for health examinations. And that demand, in turn, will require physicians who will make not only the initial examination, but also periodic examinations in order to keep the health once gained. Just as preventive medicine opened up new opportunities for the family doctor, so does this new field of obtaining and maintaining "Grade A" health. One interesting psychologic fact remarked upon by physicians is the growing willingness of people to pay liberally for such examinations, a willingness which usually means a broader intelligence and appreciation of the physician's service than when they came for examinations because of the dread of disease.

When the positive health program can be made of interest to one hundred of every hundred persons in a locality, not just to a segregated group affected by disease, the possibilities of its interpretation by physician, individual, and community will be unlimited. Such an interpretation means a balance of every day living. Such a balance means efficiency, which, in turn, means happiness.


COOPERATING NATIONAL ORGANIZATIONS
5 5 5 5 5 5 5 5 5 5 5 5 5 5 5
HOUSE OF DELEGATES
President and 4 members of each organization and 5 delegates at large
Appointment
Plans
Execution
BOARD OF TRUSTEES
9 Members
TECHNICAL COMMITTEES
STAFF
THE WOMEN'S FOUNDATION FOR HEALTH, INC.
370 Seventh Avenue, New York
COOPERATING ORGANIZATIONS
50,000,000 WOMEN AND GIRLS

The manner of the Foundation's cooperation and possibilities of contact with women's national organizations is indicated in the accompanying chart. The organizations are:

American Association of University Women
American Home Economics Association
Council of Jewish Women
General Federation of Women's Clubs
Medical Women's National Association
National Association of Deans of Women
National Board Young Women's Christian Associations
National Congress of Mothers' and Parent-Teacher Associations
National Council of Women
National Federation of Business and Professional Women's Clubs
National League of Women Voters
National League of Girls' Clubs
National Woman's Christian Temperance Union
National Women's Trade Union League
Woman's Department: National Civic Federation

The present members of the Board of Trustees are:

Mrs. Edward R. Hewitt, Chairman, New York City
Mrs. Rogers H. Bacon, Woman's Committee of National Civic Federation
Mrs. Elmer Blair, Chairman, Division of Public Welfare, General Federation of Women's Clubs
Miss Rose Brenner, President, National Council of Jewish Women
Dr. Anna L. Brown, Director, Bureau of Social Education, National Board, Young Women's Christian Association
Miss Marion Booth Kelley, President, New York State Federation of Business and Professional Women's Clubs
Dr. Martha Tracy, Dean, Woman's Medical College, Philadelphia
Mrs. Ella Boole, Vice President, National Women's Christian Temperance Union

The President of the House of Delegates is Dr. Martha Tracy, Dean, Woman's Medical College, Philadelphia; the Vice President, Miss Mary E. Wooley, President, Mt. Holyoke College, South Hadley, Massachusetts, and the Secretary, Mrs. D. W. Cooper, President, New Jersey Mothers' Congress and Parent-Teachers Associations, Pankhurst Place, Montclair, New Jersey.

HEALTH NEWS AND VIEWS

A SUBSTANTIAL WELCOME TO HYGEIA BY THE ALLEGHENY COUNTY MEDICAL SOCIETY

The Allegheny County Medical Society, Pittsburgh, has shown a practical appreciation of HYGEIA which has been highly gratifying to those responsible for its launching. This society has sent in a check covering a subscription for every one of its 1,219 members, and it promises to add to this good work by sending in a list of subscriptions for certain civic organizations in Pittsburgh. Such evidence of confidence in the new venture has greatly stimulated and encouraged the editorial staff.

EYE-SIGHT CONSERVATION

Late in January the Eye-Sight Conservation Council of America, representing the joint work of numerous engineering, educational and medical organizations, announced the publication of its second bulletin for the establishment of eye-sight conservation days in public schools. The council does not presume to set any definite day, but recommends that at least two days in each year be arranged by the superintendents of schools and health officers for this purpose. The object of the eye-sight conservation day is merely to discover whether the child has a defect of vision rather than to determine the degree of deficiency. The council, from its national headquarters at the Times Building in New York City, furnishes a vision chart for schools and also has available numerous pamphlets and folders which tell in story form the message of the care of the eyes.

The bulletin is an attractive pamphlet containing instructions on the use of the vision chart and the recording of the results of observations; it also contains directions as to methods for verification, notification, and follow-up after the discovery of visual defects. The extreme importance of early discovery of visual defects in relation to health and education cannot be overemphasized.

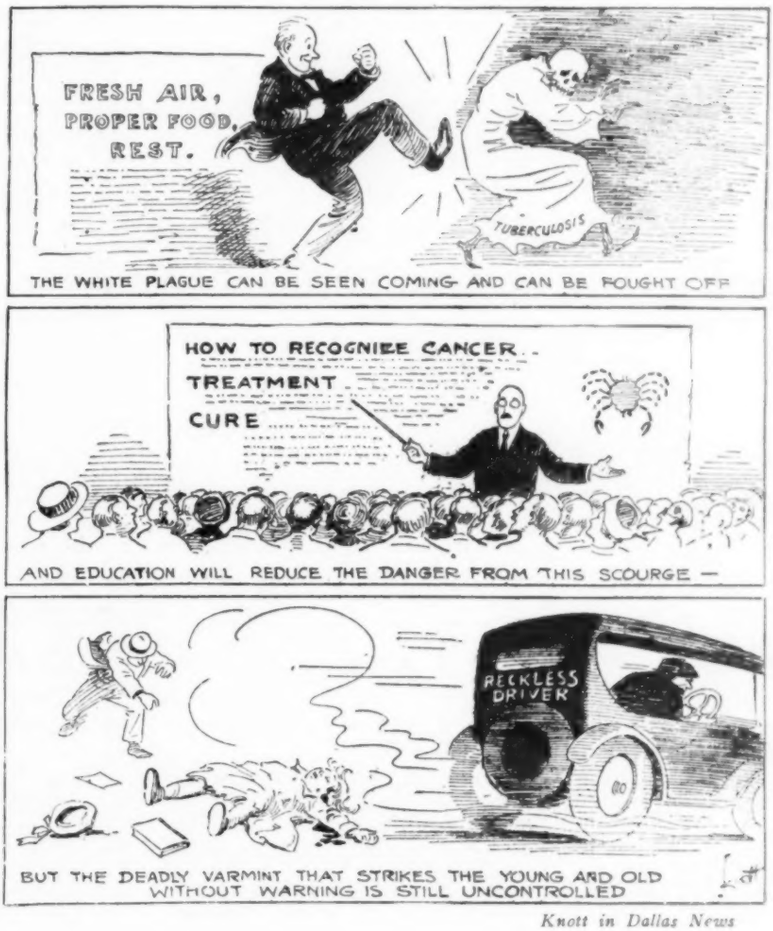
ASSUMING AND SUPPOSING WITH TYPHOID FEVER

According to the report of the Bureau of the Census, more than 8,000 persons died from typhoid fever in the registration area of the United State in 1921. On the assumption that the death rate for the entire country was the same as for the registration area, which comprises 82 per cent. of the population, the total number of deaths from typhoid fever was reckoned to be 9,756. For the sake of this computation, suppose 9,756 persons, all happy and well, are vaccinated against typhoid. How many of them will contract the disease and how many will die? The answer may be found in the incidence of the typhoid group of diseases in the American Expeditionary Forces, the entire personnel of which were vaccinated, noted by Vaughan in *The Journal of the American Medical Association* for April 24, 1920 as less than 0.1 per cent. The mortality from typhoid among 270 soldiers previously vaccinated who had cases of typhoid, proved by bacteriologic tests, was 11 per cent. If these percentages were applied to the 9,756, who, it will be assumed, had all been vaccinated, only 9.8 persons of that number would have contracted typhoid fever, and of these only one would have died. Deducting the one person who probably would have died even though he had been vaccinated from the 9,756 who died leaves 9,755 who we assume died needlessly because they neglected to be vaccinated. We suppose all of these unfortunate persons assumed they would never have typhoid fever.

PUBLIC HEALTH PAMPHLETS SENT IN ARIZONA

The Arizona State Board of Health has pamphlets available on many subjects of public health and hygiene. These are sent to citizens on request. The state board of health in almost every state also provides pamphlets on a number of subjects. Learn what your state health department has to give you.

THE MENACES


FRESH AIR, PROPER FOOD, REST.
TUBERCULOSIS
THE WHITE PLAGUE CAN BE SEEN COMING AND CAN BE FOUGHT OFF
HOW TO RECOGNIZE CANCER
TREATMENT
CURE
AND EDUCATION WILL REDUCE THE DANGER FROM THIS SCOURGE —
RECKLESS DRIVER
BUT THE DEADLY VARMINT THAT STRIKES THE YOUNG AND OLD WITHOUT WARNING IS STILL UNCONTROLLED

Knott in Dallas News

NEW DENTAL CLINIC FOR CHILDREN OPENED IN CHICAGO

In the dental clinic for children recently opened in Northwestern University, Chicago, special arrangements have been made to make the care of the teeth especially attractive to little visitors. In the waiting room, which is bright and airy, the decorations include illustrations from "Mother Goose," and there are toys, sliding boards, sand boxes and other amusements. On the first visit the child is examined in a small chair, especially built for children. The children are instructed in tooth brush drill and receive actual demonstrations in the proper employment of the tooth brush. The proper time for attention to the teeth is all the time. The first tooth comes whe. the baby is six months old. To calculate the proper number of teeth up to eighteen months of age subtract six from the age in months. At two years the baby has sixteen teeth. At two and one half years it should have twenty teeth.

Underwood

International

Underwood

THE DEADLY AUTOMOBILE

A thud! Perhaps a slight jolt! And when the careless motorist speeds away he leaves behind, unconscious in the dust of the street, the shattered body of an innocent, helpless child. This photograph, taken in a Cincinnati hospital, shows a little girl with a fractured leg. In order to secure proper joining of the bones she has been compelled to lie in the position shown for five weeks. The leg is held in extension by weights attached to the rope which passes from the child's leg through the pulley. The pulley is suspended from a so-called Balkan frame, a device generally used throughout the World War for the care of broken limbs, following gunshot wounds or other mishaps. The disasters of peace are just as deadly as those of war. But a little more carefulness might have prevented the pain which this child was compelled to suffer. The secret of safety in motoring is simply carefulness.

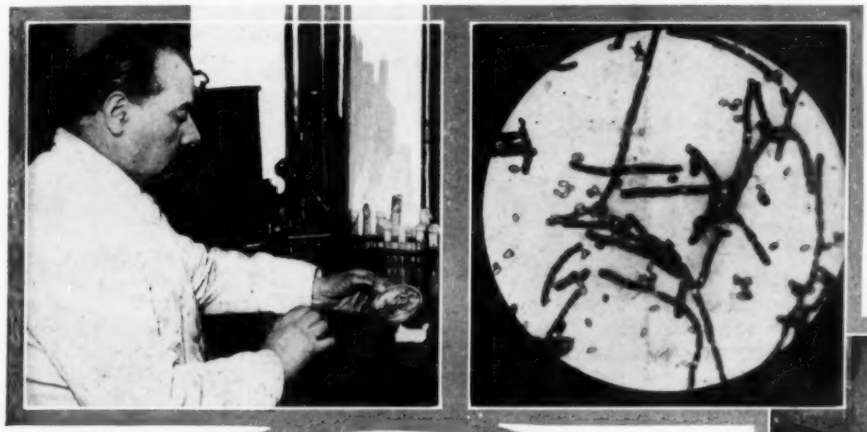
INTERNATIONAL COMMISSION FIGHTS ANTHRAX (MALIGNANT PUSTULE) INFECTION

Recently an international commission met in London to solve the problem of the disinfection of wool and hair infected with anthrax germs. On the left is a worker with cultures of the anthrax organism; on the right a specimen of the organism magnified five thousand times.

Anthrax is an ancient disease; it is believed to have been the murrain of the Egyptian plagues. In Italy from 1890 to 1902 it killed 2,100 persons. Before Pasteur, epidemics of anthrax used to devastate the sheep herds and cattle of France. In 1877, Pasteur cultivated the organism from the blood of animals dead of anthrax. He discovered that the organism could be cultivated in a weakened form at high temperatures and prepared an attenuated virus which he used as a vaccine. On May 5, 1882, Pasteur inoculated twenty-five sheep with his protective vaccine. On May 17 the sheep were given a second injection. On May 31, this flock of twenty-five sheep and twenty-five not protected were inoculated with an anthrax virus of full strength. On June 2 the inoculated sheep were all in good health whereas twenty-two of twenty-five not vaccinated were dead and the remaining three dying.

During the last few years cases of anthrax have appeared in the United States and in England, carried from hides and the hair in shaving brushes which had not been properly sterilized before importation.

Certain occupations such as butchers, tanners, sheep shearers, furriers and glove makers, dealers in hay and grain, and wool sorters, are especially exposed to this infection. The primary infection in man is most frequently through slight wounds on the skin where malignant pustules form. The lungs may be infected through inhalation.



International

International

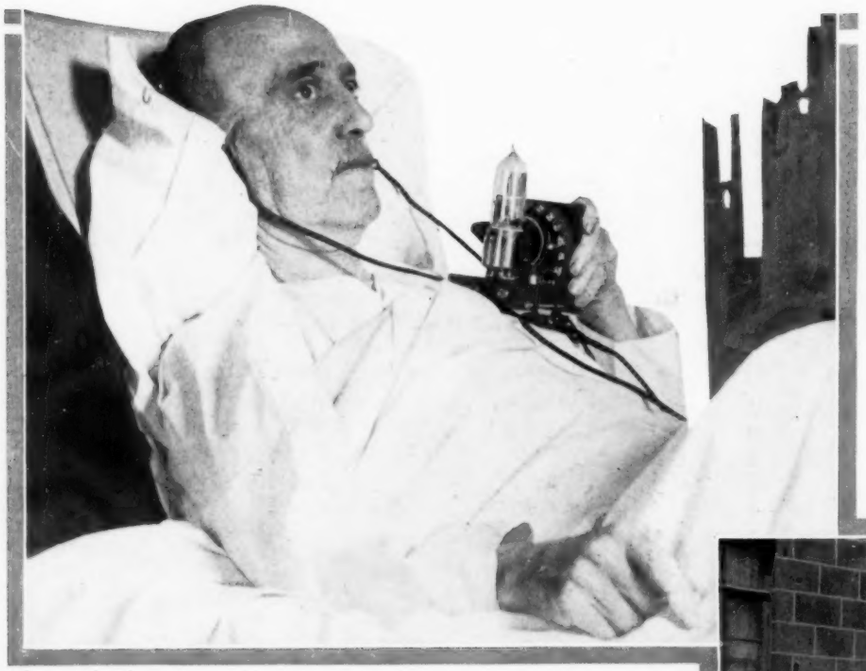
DISINFESTING THE SHIP

Rats and vermin on board ship are dangerous not only to property but also to human beings, for they carry disease. When ships arrive in port they may be cleansed of all kinds of pests by fumigation with cyanic acid (prussic acid) gas, a dangerous poison. The men doing the work are protected against the effects of the poison by special gas masks and breathing devices as shown in the illustration. The sign is a warning to the public that to go on board will be fatal while the ship is being fumigated. Rats carry typhus and plague, while fleas, flies, lice and other insects may carry many dangerous diseases well nigh as fatal as prussic acid itself.

International

POST OFFICE EMPLOYEES TO REST AT WORK

In this illustration first assistant postmaster-general John H. Bartlett is trying out one of the new rest stools installed in the Washington post office for the carriers and clerks who sort mail. Gradually healthful and scientific measures are being introduced into industry and the government services. It is becoming known that increased efficiency succeeds proper care of the employees' health. The post office department has also announced plans for regular physical examinations.



International

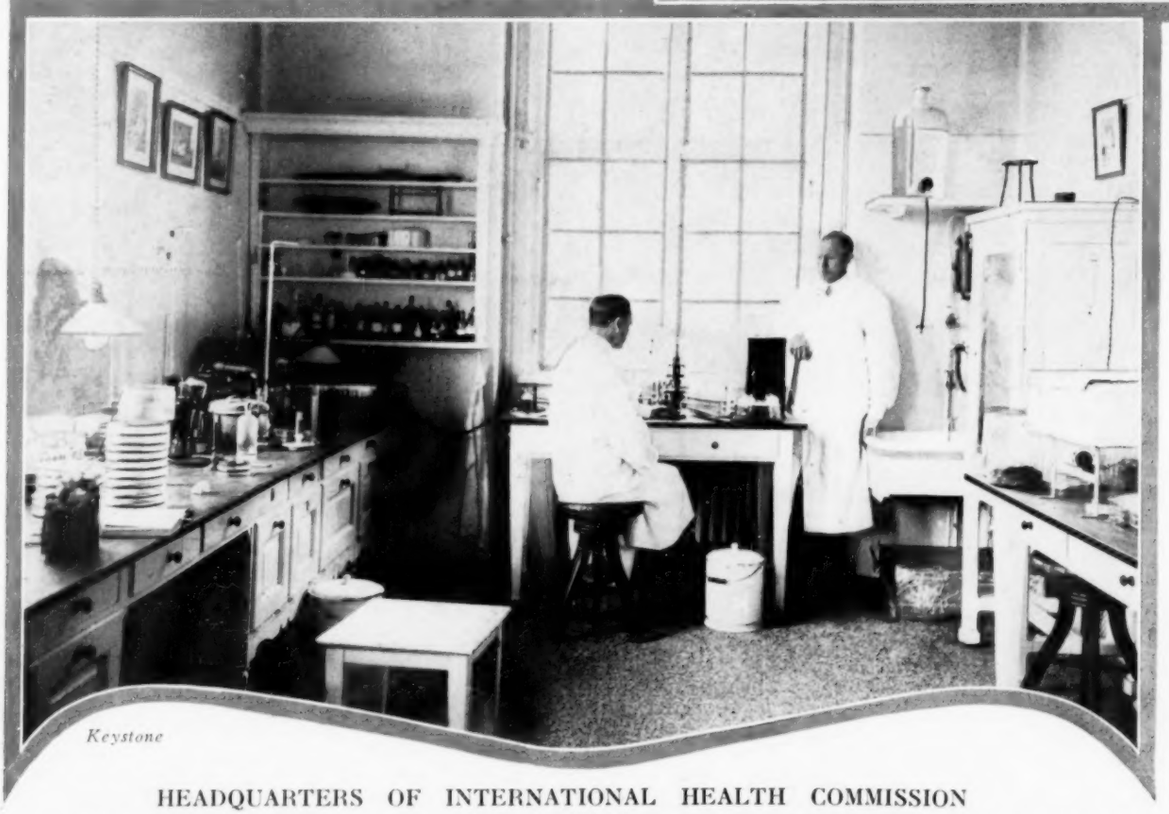
MAKING LIFE INTERESTING FOR THE PATIENT

This patient, in a hospital at Washington, D. C., is listening to a concert with what is said to be the smallest tube radio set known. The set is the invention of B. J. Foy, in charge of the electrical training courses at the Washington War Veterans' Bureau. With this device the patient was able to hear a concert broadcast from St. Louis, Missouri. Life is made more pleasant for hospitalized patients by the use of the "movie," radio, phonograph, and by well adapted occupational therapy.

FIGHTING TRACHOMA

One of the largest trachoma clinics in the world, at Alexandropol, Armenia, where relief doctors and nurses under Dr. Russel T. Uhls, Near East Relief physician, of White City, Kansas, treats hundreds of youngsters daily for the dread eye disease.

Keystone



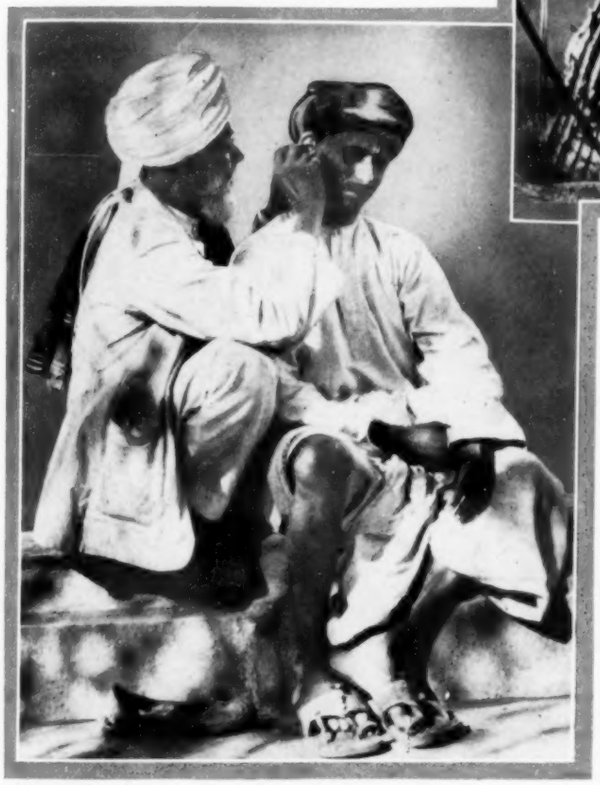
Keystone

HEADQUARTERS OF INTERNATIONAL HEALTH COMMISSION

A view of the laboratory of the International Serum Institute Headquarters of the National Health Commission appointed by the League of Nations in Copenhagen, Denmark.

FADS IN CLEANLINESS ROUND THE WORLD

This bewhiskered practitioner is a Hindoo specialist on the ear. "All good Hindoos," says the photographer, "must have their ears scooped out regularly." Many a patient has been surprised to discover that his gradual loss of hearing was due to accumulation and hardening of wax, cerumen, in the ear; the hearing was promptly restored when the physician syringed the canal with lukewarm water, or removed the obstruction.



International

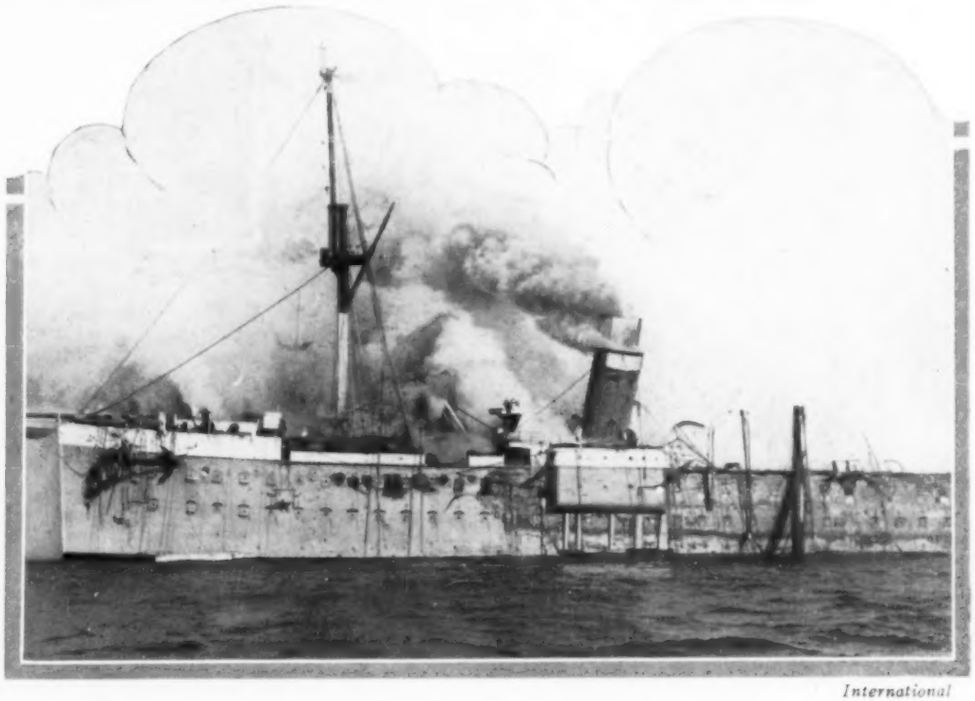
International

DRIED FISH AS A WINTER DIET

In Japan dried fish is a staple portion of the winter diet of many of the common people. In the photograph is shown a common method of preparation. Skewers are run lengthwise through dozens of small fish, and then are stuck in the ground around a brazier, which is in the form of a large iron kettle containing fire. The kettle is supported by a tripod. In order that the fish may become uniformly dry, these skewers must be turned frequently, so the Japanese woman squats beside the fire and tends the fish. The opinion was once held that the stature of races varied according to climate, but it is now more generally believed that racial differences are chiefly the results of variations in food. According to Dr. Hirai, professor of the diseases of children in the Imperial University of Kyoto, the Japanese child has rice as the most important part of its diet after infancy. It receives no milk, cheese or butter as a regular part of the diet and the fats used are principally vegetable oils. It rarely gets meat, but takes much fish. Dr. L. Emmett Holt considers the diet clearly deficient in growth proteins and probably in the fat soluble vitamin and in calcium.

FRENCH HOSPITAL SHIP IN UNUSUAL DISASTER

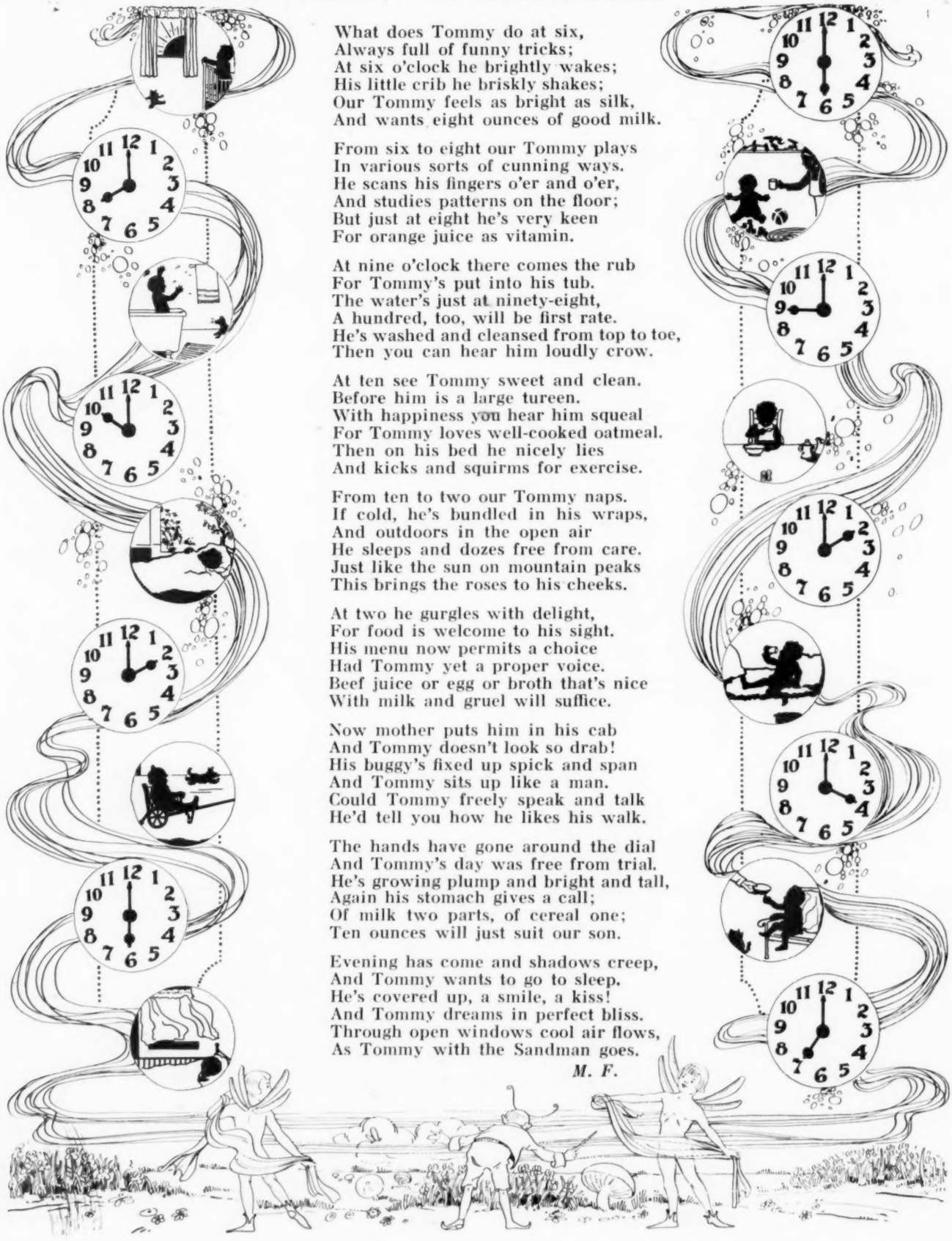
The French hospital ship *Vinh-Long* caught fire while carrying doctors, nurses, troops and medical supplies from Toulon, France, to the near east. The U. S. S. *Bainbridge* picked up the distress call and by pushing her nose up against the bow of the burning ship managed to save all but about twenty of those on board. The hospital ship is a further exemplification of the way in which the science of medicine is brought into the service of the public under the most trying conditions.



International

AROUND THE CLOCK WITH BABY

Our Hero: Tommy Toddler, 1 year of old age
Heroine: His Adoring Mama.
Stage: Director: The Doctor Man.



What does Tommy do at six,
Always full of funny tricks;
At six o'clock he brightly wakes;
His little crib he briskly shakes;
Our Tommy feels as bright as silk,
And wants eight ounces of good milk.

From six to eight our Tommy plays
In various sorts of cunning ways.
He scans his fingers o'er and o'er,
And studies patterns on the floor;
But just at eight he's very keen
For orange juice as vitamin.

At nine o'clock there comes the rub
For Tommy's put into his tub.
The water's just at ninety-eight,
A hundred, too, will be first rate.
He's washed and cleansed from top to toe,
Then you can hear him loudly crow.

At ten see Tommy sweet and clean.
Before him is a large tureen.
With happiness you hear him squeal
For Tommy loves well-cooked oatmeal.
Then on his bed he nicely lies
And kicks and squirms for exercise.

From ten to two our Tommy naps.
If cold, he's bundled in his wraps,
And outdoors in the open air
He sleeps and dozes free from care.
Just like the sun on mountain peaks
This brings the roses to his cheeks.

At two he gurgles with delight,
For food is welcome to his sight.
His menu now permits a choice
Had Tommy yet a proper voice.
Beef juice or egg or broth that's nice
With milk and gruel will suffice.

Now mother puts him in his cab
And Tommy doesn't look so drab!
His buggy's fixed up spick and span
And Tommy sits up like a man.
Could Tommy freely speak and talk
He'd tell you how he likes his walk.

The hands have gone around the dial
And Tommy's day was free from trial.
He's growing plump and bright and tall,
Again his stomach gives a call;
Of milk two parts, of cereal one;
Ten ounces will just suit our son.

Evening has come and shadows creep,
And Tommy wants to go to sleep.
He's covered up, a smile, a kiss!
And Tommy dreams in perfect bliss.
Through open windows cool air flows,
As Tommy with the Sandman goes.

M. F.

Milk Song

Folk-tune
Arr. by Gustaf Hägg
Used by Courtesy of G. Schirmer, Inc.
Words by Mrs. Frederick Peterson

Allegretto
f
Come, come, sing a song of milk, 'Tis milk that sets us a-grow-ing.
f
p
Milk will make us fine as silk, then let us keep milk a-flow-ing. To
p
f
each of you I'll give a cup and then I'll drink my own milk up, 'Twill
f
bring us up in our weight you know, and soon we'll be round and ro-sy.

Courtesy of Child Health Organization

Copyright, 1909, by G. Schirmer, Inc.

Simple Simon and the Doctor

Simple Simon met a doctor
Coming from the school
Said Simple Simon to the doctor
"Have you any rule?"

Said the doctor to Simple Simon
"You must gain in weight!"
Said Simple Simon to the doctor
"This is what I ate:

"Coffee and bread for breakfast
For supper, bread and tea,
Pickles and pork for dinner
Is what mammy gave to me."

Said the doctor to Simple Simon
"Dear me, that's too bad."
Said Simple Simon to the doctor
"What should I have had?"

"Oatmeal and milk in the morning,
Milk and brown bread at night
Good vegetable soup for dinner
To set a boy growing right."

Said Simple Simon to the doctor
"Tell me what is Health?"
And the doctor said to Simon
"It is Happiness and Wealth."

MRS. FREDERICK PETERSON

BOOK REVIEWS

NUTRITION AND GROWTH IN CHILDREN: By William R. P. Emerson, A.B., M.D., Price, $2.50. Pp. 342. New York. Appleton and Company. 1922.

Dr. Emerson's work in developing nutritional classes is now well known throughout this country. Since he began his first nutritional class in 1908 the subject has had wide attention, culminating in the incorporation of a national organization, Nutrition Clinics for Delicate Children, in 1919. In connection with these clinics special institutes have been held for the teaching of the Emerson methods. In the present volume the author offers the main practical points for use in controlling the work. The book is divided into sections dealing with the diagnosis of nutrition, malnutrition and the home, a nutrition program for the community, and several appendices containing valuable statistical material. The entire matter is presented in such a way as to be easily understandable by the intelligent reader. Complete directions are given for instituting the proper nutritional classes in schools and organizations as well as in the home. If there is any criticism to be made of the book, it is of the apparent overemphasis on maintaining certain definite weights as the most important thing in life. Not enough seems to be said concerning normal variations in weight in certain body types. Dr. Emerson's contribution to the problem of nutrition of the child has been important, and it is well to have available this complete and practical presentation of it.

CIVILIZATION AND CLIMATE: By Ellsworth Huntington. Second Edition. Price, $3.50. Pp. 333. New Haven. Yale University Press. 1922.

Professor Huntington stands as the recognized authority on the subject discussed in this volume. More attention was paid to the influence of climate on the health and development of man a hundred or more years ago than now. The discovery of bacteria and the causative relation to disease has led to the neglect of other conditions affecting the welfare of the human body. Professor Huntington, in the volume, sets forth his recommendations in scientific and forceful terms. Whether or not we agree with him in all his conclusions, it must be admitted that in attributing all the ills of mankind to microscopic life we have neglected, to some extent at least, the study of our environment. The first edition of this book awakened much thought and in the second edition the author has strengthened the theories which he set forth in the first. We recommend Civilization and Climate to all persons interested in protection from disease and the extension of human life.

BODY MECHANICS AND HEALTH: By Leah C. Thomas and Joel E. Goldthwait. Price, $1.25. Pp. 112, with illustrations. Boston. Houghton Mifflin Company. 1922.

The authors, believing that the highest aim of physical education is to develop human beings fitted to cope with the conditions of modern civilization, have outlined a type of physical work to be applied for the correction of bad posture and carriage. Special emphasis is placed on the development of the trunk muscles, especially those of the abdomen, as a basic necessity of good posture. The greatest emphasis in the first chapter is laid on correct standing, and it is pointed out that it is useless to instruct a class in gymnastics without emphasizing this fact, since immediately following the exercises the pupils relax into the old unsatisfactory positions. The rules for posture are so simple that we repeat them: "Stand tall—head up—chin in—chest high—abdomen flat—weight on the balls of the feet. This position should be attained without strain."

The succeeding chapters in this book deal with rest, the value of lying exercises, sitting and standing, the correction of round shoulders, and the various types of body. The book is supplemented with complete directions for progressive exercises in breathing, abdominal retraction, rib stretching, and the like. It is an exceedingly sound, concentrated, and practical work on the subject.

PERSONAL HYGIENE APPLIED: By Jesse Feiring Williams. Cloth. Price, $2.50. Pp. 412, with illustrations. Philadelphia. W. B. Saunders Company. 1922.

This book has been planned by its author for use by college students who wish not only to learn personal hygiene but also to relate the securing of health to ideals, ambitions, hopes, and aspirations. For this reason the first five chapters of this book are devoted to such subjects as the meaning of health, the health problem, intelligence and ideals, the approach for knowledge of health and science and attitudes. Health is defined as that quality of life that renders the individual fit to live most and to serve best. In the chapter on science and attitudes Dr. Williams presents a brief but adequate criticism of the attitude of Christian scientists toward modern medicine and of the fundamental basis of chiropractic, osteopathy, and several occult methods of healing. The remaining chapters of this book are devoted to the hygiene of various parts of the body classified under systems such as the respiratory, circulatory and digestive. The significant feature of the discussions is their rationality. The author has carefully considered the various sources of material and he seems to have an instinct for the sound, proved facts, as compared with the theoretical belief. For intelligent readers the book by Williams may be recommended as a safe guide and a thoroughly readable outline for the care of the body.

HEALTH AND EFFICIENCY: By John Daly McCarthy. Cloth. Price, $1.32. Pp. 262, with 110 illustrations. New York. Henry Holt and Company. 1921.

This book contains chapters on the structure of the human body; posture and exercise; air and breathing; food and diet; care of the mouth, nose and throat; digestion, absorption and circulation; the hygiene of the skin and the use of clothing; the organs of sense; mental hygiene; school hygiene; hygiene of the home; first aid to the injured; food distribution; disposition of waste; infectious diseases; industrial hygiene; and community control of disease. The illustrations are not only pleasing, but also instructive. The text is free from exaggeration.

THE CONTROL OF SEX INFECTIONS: By J. Bayard Clark, M.D. Cloth. Price, $1.50. Pp. 132. New York. Macmillan Company. 1921.

This is a readable, interesting, and sensible discussion of the question involved. It may be read with profit by all adults. So far as we can see it would be of less value to the young. The author suggests that every child should be taught by its parents the truth about how children and other young animals come into existence. The family cat, it is suggested, might

be utilized for this purpose. He states that all childish questions concerning the coming of the baby should be answered by the parents truthfully and without equivocation. For the control of sexual infections after puberty the author recommends universal military training with special emphasis on venereal diseases, their nature, and their prevention in the training camps. Girls should be sent to similar camps and supplied with instruction especially fitted for them. One is impelled to ask: Why could not all this be done in the public schools, and what advantage would there be in turning the matter over to the federal government? The author also recommends that certificates of freedom from venereal diseases should be required when a marriage license is sought.

ITALIAN HEALTH PAMPHLETS: Edited by L. Capelli, M.D., Trieste, Rocca San Casciano.

In the past twenty-five years Italy has done great things in preventive medicine in the way of scientific investigation and of practical application. Although the malaria parasite was discovered by a Frenchman (Lavaran) and its transmission by a mosquito was demonstrated by an Englishman (Ross), Italian scientists supplied much scientific information as to the nature of malaria, and contributed greatly to our knowledge of the methods by which this disease may be controlled and finally eradicated.

Of the four public health pamphlets by Dr. Capelli, the first is on elementary hygiene for the school and family. It sets forth facts on the structure of the human body and the function of the various organs, and contains statements bearing on the nature and prevention of diseases prevalent in Italy. The second is a little manual on the care of the baby in which much attention is given to the child's food and its causative relation to the diarrheas of infancy. The third is a brochure on insomnia and its hygienic treatment. The fourth, which is devoted to tuberculosis, is up to date and should prove valuable to those who read Italian.

MISCELLANEOUS NOSTRUMS: Paper. Price, 30 cents. Pp. 120, with illustrations. Chicago. American Medical Association. 1923.

This is the fifth and latest edition of the pamphlet of this name, one of a group prepared by the Propaganda Department of *The Journal of the American Medical Association* on the subject of the nostrum evil and quackery. Other pamphlets of the series deal with nostrums sold for the alleged cure of specified conditions such as epilepsy, consumption, cancer, and deafness. There are on the market, however, hundreds, probably thousands, of "patent medicines" of the "cure-all" type whose alleged curative virtues are not limited to any one group of diseases. It is with preparations of this sort that the present pamphlet deals. There are nearly 500 "patent medicines" described in the pamphlet. Some of these are discussed at length, going into details of their method of exploitation; others are dealt with more briefly. In every case, however, the composition of the product, as found by independent investigators, is given. The pamphlet will prove a mine of information for those who are interested in the subject with which it deals.

INDIVIDUAL GYMNASTICS; A HANDBOOK OF CORRECTIVE AND REMEDIAL GYMNASTICS: By Lillian Curtis Drew. Cloth. Price, $2.00. Pp. 225, with 100 illustrations. New York, Lea and Febiger. 1922.

This handbook has a foreword by E. G. Bracket of Boston, one of the foremost authors and surgeons in the United States. The directions for systematic exercise, the ills of faulty posture, the treatment of certain deformities, and methods of exercise recommended are all discussed in a simple and sane way without fads.

BOXING: By D. C. Hutchison. Cloth. Price, $1.00. Pp. 120, with 36 illustrations. New York. The Macmillan Company. 1923.

Boxing, says the author—and it is freely admitted—cannot be learned from a book. It is desirable and usually necessary to secure instruction from a proficient teacher, and to supplement this instruction with a little actual work with a sparring partner. However, after the rudiments of the science are learned, practical hints such as are contained in this handbook will be found helpful. The author indicates that certain physical attributes are especially important. "To become a good boxer requires certain physical and temperamental characteristics, without which it is not advisable to take it up. If you are fairly strong and agile, have a good normal heart, good lungs and stomach, unobstructed breathing organs, good eyesight, well-knit though not necessarily large hands; if you are temperamentally alert, have a fairly even temper, and are willing to accept physical punishment with equanimity you are pretty well equipped." It appears then that the requirements for success in boxing are those of a good mind and body. Readers will find that much the same requirements are desirable in every field of human activity.

THE PSYCHOLOGY OF MISCONDUCT, VICE, AND CRIME: By Bernard Hollander, M.D. Cloth. Price, $2.00. Pp. 220. New York. The Macmillan Company. 1923.

This book contains the results of the author's reflections on experiences with individual delinquents whom he has seen during a practice of twenty-five years. He attempts to show, through study and analysis of individual cases, that morality is a gradual growth, arising from the conflict between the unconscious instinctive tendencies to self-gratification and self-preservation, and the gregarious instinct which produces in man the various affections, parental, filial, and social, and ultimately tends to altruistic conduct. He points out further that in judging a moral patient, the physician must take into account his heredity, environment, and early education, as well as any possible disorder or defect of the brain, and the nutrition and circulation, on which its proper functioning depends. The treatment of such conditions must therefore be both mental and physical. Mental therapy alone, in the form of persuasion, suggestion and autosuggestion, hypnotism, psychologic analysis and reeducation, may be of service, but should never be undertaken without a previous survey of the patient's physical status.

PRACTICAL TALKS ON THE CARE OF THE BABY: By Mary E. Bayley, R.N. Cloth. Price, $3.50. Pp. 344. New York. E. P. Dutton and Company. 1922.

This is a valuable book for mothers. It contains practical talks and directions for the prospective and the actual mother. It discusses in detail and in plain language the clothing, food, and other things pertaining to the health of the child. We are glad to find in it a chapter on factors influencing the nervous health of the child. The book closes with the brief statement concerning the prevention of the ordinary diseases of childhood before and after the school age.

AIDS TO TROPICAL HYGIENE: By Col. R. J. Blackham. Preface by Lt.-Gen. Sir John Goodwin. Second Edition. Cloth. Price, $1.75. Pp. 240. New York. William Wood and Company. 1922.

This is an excellent manual for those who are intending to visit the tropics. It contains chapters on climate, water supply, housing, foods, clothing, disposal of refuse, and the diseases prevalent in the tropics. Special attention is given to those diseases which are transmitted by infection and those caused by animal parasites.

QUESTIONS AND ANSWERS

If you have a question relating to health that you want answered, write to "Questions and Answers," HYGEIA, enclosing a two-cent stamp. If the question is of general interest, the answer will be published; otherwise it will be answered by mail. The names of correspondents will not be published. The questions answered below are some recent ones of the thousands received by The Journal of the American Medical Association from persons who are not physicians.

Frying as a Means of Preparing Food

To the Editor:—A group of us have been assigned, as a special research problem, the effect of fried foods on the gastric secretion, but we have been unable to find anything definite on the subject. We would appreciate it very much if you could give us any advice or refer us to literature on this point. E. G. M., California.

Answer.—Frying, as usually employed, is considered the least serviceable method in the cooking of food. The fat or oily material permeates the food and makes it difficult for the digestive juices to penetrate. According to Friedenwald and Ruhräh, the frying of meat, even in deep fat, produces fatty acids which have a tendency to irritate the stomach and cause indigestion. It is generally well known that food fried in deep fat absorbs less of the fat than that which is sautéd in a frying pan. This may be determined by frying two pieces of fish of equal weight by the two methods and then reweighing to determine the amount of fat which has been absorbed. An excellent article on deep fat frying appears in the *Delineator*, for January, 1923.

Danger of Exhaust Gas

To the Editor:—Does poisonous gas escape in the exhaust of a gasoline engine, and will it kill a man if he is confined in a closed room with it? Can you refer me to a paper or a book dealing with such gases? H. M., Arkansas.

Answer.—It has been known for some years that it is exceedingly dangerous to life to remain in a closed garage near to the exhaust of a running gasoline engine. The exhaust gas contains large amounts of a dangerous poison, known as carbon monoxide gas, the same substance in the usual form of illuminating gas that causes death. It is important that garages be fully ventilated, especially during periods when the motors are running. The gas is invisible and has not a marked odor. It is important that the garage doors be kept open, and that the motorist never lie under the car indoors when the motor is running. In cases of poisoning the victim should be removed immediately from the poisoned atmosphere. It is essential to get oxygen into his lungs as quickly as possible. Fresh air and mild stimulation are desirable, since it is a matter of life and death. A physician should be called promptly. Artificial respiration may be administered by manual methods. It is best not to wait for the coming of artificial respiratory devices. Following are directions for administering artificial respiration: Lay the victim on his stomach with his face to one side so that his nose and mouth are free for breathing. Place the victim so that one arm is straight out beyond his head, the other under his head; this position is important as it helps to expand his lungs. Kneel straddling the victim's thighs and facing his head; rest the palms of your hands on his loins (the muscles of the small of his back) with your thumbs nearly touching each other and with the fingers spread toward his lower limbs. With arms held straight, swing forward slowly so that the weight of your body is gradually, but not violently, brought to bear on the victim. This act should take about two seconds. Then, with your hands in place, swing backward and forward; a complete respiration requires about four seconds. Keep the movements in time with your own breathing.

"Rheumatism"

To the Editor:—I understand your work is for the good of mankind. I would like the very best advice as to diet and treatment to cure and prevent rheumatism. I am suffering right now from sciatic rheumatism. I am fifty years old and of a rheumatic nature, and I am anxious to do everything that will relieve or cure me, as I do not wish to become a helpless woman. For months I have eaten but very little meat, not much white bread or potatoes. I am willing to deny myself many things if need be. I am not troubled with constipation. My work keeps me on my feet much of the time. S. R., Illinois.

Answer.—It is impossible from the description of the symptoms given to make an exact diagnosis. There are many conditions affecting joints which may be called by the name of rheumatism. The term is usually applied to rather ill defined pains in the bones, muscles, and joints which may arise from infections of various kinds elsewhere in the body or even from mechanical conditions. In one instance when a physician studied thoroughly a great many cases called rheumatism he found the cause to vary among such disorders as acute infections, neuritis, sciatica, tuberculosis, syphilis, and, in fact, many other disturbances. As may be seen, it is not satisfactory to recommend treatment for the condition without having definite knowledge of the particular cause responsible in the individual case. When the cause is known it is possible to afford relief by properly prescribed medicaments and possibly to arrest progress of the disease by eliminating the cause. There is no proof that meat causes rheumatism and, in general, prolonged abstinence from meat is not advisable. On the other hand, it is known that meat contains what are called the purin substances and that too much meat may have a deleterious effect so that the meat ration is perhaps best reduced. In such instances eggs, green vegetables, and cereals may constitute the main part of the diet.

Marmola

To the Editor:—If possible, will you kindly give me the analysis of the "patent medicine" called "Marmola Prescription Tablets"? It is to be used for the reduction of flesh. I should like to know if there is any harmful drug in it. Its peculiar action on the nerves leads me to believe that there is. C. O. P., New York.

Answer.—The active drugs in this nostrum have been found by various investigators to be dried thyroid gland and phenolphthalein. Thyroid extract, a valuable drug in certain conditions, is much too powerful to be used except under a physician's

orders. Severe and obscure nervous symptoms have followed the use of "patent medicines" containing this substance.

Vitamins in Food

To the Editor:—I am told that a committee of the American Medical Association has reported that not all of the three known vitamins are essential. Can you refer me to an article on the point understandable to a layman, or at least tell me whether I have been correctly informed? Is it not still true that a dietitian should try to rotate the foods in such a way as to make sure of all vitamins?

H. W. F., New Jersey.

Answer.—It is generally believed that all of the vitamins have an essential part in proper development of the body. It is quite certain that the American Medical Association has not published a statement to the effect that any of the known vitamins are not essential. It has been emphasized repeatedly, however, that the selection of a properly balanced diet is sufficient to provide the necessary vitamins, and that it is not necessary to depend on any special manufactured preparations of vitamins or vitamin concentrates. Above is reproduced in miniature a chart showing the presence or absence of the various vitamins in various common food substances.

VITAMINS IN FOODS

	"A"	"B"	"C"
BREAD, WHITE (WATER)	?	+	–
" , " (MILK)	+	+	?
" WHOLE WHEAT (WATER)	+	++	?
" , " " (MILK)	++	++	?
BARLEY (WHOLE)	+	++	–
CORN, YELLOW	+	++	–
OATS	+	++	–
MEAT, LEAN	–"+	+?	+?
BEEF FAT	+	–	–
MUTTON FAT	+	–	–
PIG KIDNEY FAT	++	–	–
OLEOMARGARINE	+	–	–
LIVER	++	++	+
KIDNEY	++	++	+?
BRAINS	+	++	+?
SWEETBREADS	+	+	*
FISH, LEAN	–	+	*
" , FAT	+	+	*
" , ROE	+	++	+?
MILK, FRESH	+++	++	+V
" , CONDENSED	+++	++	+V
" , DRIED, (WHOLE)	+++	++	+V
" , SKIMMED	+	++	+V
BUTTERMILK	+	++	+V
CREAM	+++	++	+V
BUTTER	+++	–	–
CHEESE	++	*	*
COTTAGE CHEESE	+	*	*
EGGS	++	+	+?
ALMONDS	+	+	*
COCONUT	+	++	*
HICKORY NUTS	*	++	*
PEANUTS	+	++	*
PECANS	*	+	*
WALNUTS	*	++	*

	"A"	"B"	"C"
TOMATOES (RAW OR CANNED)	++	+++	+++
BEANS, KIDNEY	*	+++	*
" , NAVY	*	+++	–
" , STRING (FRESH)	++	++	++
CABBAGE, FRESH, RAW	+	+++	+?
" , COOKED	+	++	+?
CARROTS, FRESH, RAW	++	++	++
" COOKED	++	+	+
CAULIFLOWER	+	++	+
CELERY	*	+	*
CUCUMBER	*	+	*
DANDELION GREENS	++	++	+
EGGPLANT, DRIED	*	++	*
LETTUCE	++	++	+++
ONIONS	*	++	++
PARSNIP	–?	++	*
PEAS	++	++	+?
POTATOES (BOILED 15 MIN.)	*	++	+?
" (" 1 HOUR)	*	++	+?
" (BAKED)	*	++	+
SWEET POTATOES	++	+	*
RADISH	*	+	*
RUTABAGA	–?	++	+++?
SPINACH, FRESH	+++	+++	*
" , DRIED	+++	++	*
SQUASH, HUBBARD	++	*	*
TURNIPS	–?	++	*
APPLES	+	+	+
BANANAS	+?	+?	+
GRAPE JUICE	*	+	+
GRAPEFRUIT	*	++	++
LEMON JUICE	*	++	+++
ORANGE JUICE	+	++	+++
PRUNES	*	+	–
RASPBERRIES (FRESH OR CANNED)	*	*	+++

\+ contains the Vitamin
++ good source of the Vitamin
+++ excellent source of the Vitamin
– no appreciable amount of the Vitamin
? doubt as to presence or relative amount
* evidence lacking or insufficient
V variable

Venereal Disease Among Troops

To the Editor:—Will you please tell me the extent of venereal disease in our army during the World War?

H. N., Chicago.

Answer.—According to Colonel Love, this class of disease stood second as the cause of admission to sick report, being exceeded only by influenza; second as to cause of loss of time, again being exceeded only by influenza; and third as the cause of permanent military disability, being exceeded by tuberculosis and mental deficiency. The total number of cases recorded in our army was 357,969, and the total time lost on account of this disease was 6,804,818 days, which is equivalent to one year's time for approximately 18,643 men. This might be stated in another way; for example, approximately two thirds of one division at war strength was constantly incapacitated for duty as the result of venereal diseases. Recorded cases of venereal diseases were relatively more numerous during the World War (91.41) among the white and negro troops in the United States and Europe than during the Civil War (84.26), but less numerous than during the Spanish-American War and Philippine Insurrection (123.70) for each thousand. The admission rates for venereal diseases among the southern negroes during the World War was practically four and a half times as high as that among southern whites (397.72 and 88.40), and that for the other negroes was practically twice as high (191.67). Venereal diseases for the total army were most prevalent among the negroes, next among the Porto Ricans, third among the whites, and least among the Filipinos.

Converse Treatment for Epilepsy

To the Editor:—Do you know anything about the Converse Treatment for epilepsy? Will it really cure?

G. H. W., Illinois.

Answer.—The Converse Treatment contains bromides. It will not cure epilepsy and, used indiscriminately by those who are ignorant of the fact that it contains bromides, may easily result in adding to the epileptic victim's already serious condition the danger of chronic bromide poisoning. The Converse concern has obtained "sucker lists" of epileptics by mailing letters to the justice of the peace or the mayor of small towns. These letters offered cheap premiums, such as fountain pens and cook books, for the names of epileptics.

Albert Abrams and His Oscilloclast

To the Editor:—I wish to know if it is possible for you to send me the data concerning Dr. Abrams and his Oscilloclast machine.

L. R., New York City.

Answer.—Yes, a good deal of information on this subject has been published. The matter has been reprinted in the form of a leaflet which will be sent to any address on receipt of four cents in stamps.

Recommending Physicians

To the Editor:—The purpose of my writing at this time is to get a little information. Who are some reputable eye, ear, nose and throat doctors in this part of the country?

E. S., California.

Answer.—It is impossible for us to recommend individual physicians. If you have not a family physician we would suggest that you communicate with the secretary of the County Medical Society in your vicinity.

HEALTH REVIEWS

HEALTH IN CURRENT MAGAZINES

Dr. Haven Emerson calls attention in his Department on Health in the *Survey* for January 15, to recent efforts to aid the crippled child. A careful estimate based on surveys of the crippled conducted during recent years indicates that there are probably 350,000 children in the country handicapped by some limited or distorted use of muscles, joints, or bones. Even in New York City in 1920 half of all the crippled were not receiving treatment and one in six had never had a diagnosis or treatment. Naturally, the neglect must be far greater where clinics are less frequent than in the great cities. The interest in orthopedic surgery, aroused by the care of the injured during the war, has produced two nationwide movements, led by the International Society for Crippled Children, by Rotary Clubs, and by the Shriners. Dr. Emerson describes in detail the systematic campaign of the Rotarians in Ohio, some of the results of which have been repeated surveys of the situation, the establishment of diagnostic clinics, arrangements for follow-up work, and the creation of seven special schools for crippled children. Four hundred children, who were not receiving treatment, have been put in the care of the Ohio Department of Welfare. The campaign of the Ancient Arabic Order of Mystic Shriners involves an annual assessment on the membership for the establishment of orthopedic hospitals for children. For this year the assessment involves the raising of two million dollars and afterward, of one million dollars annually. The money is to be expended under the guidance of an advisory board of orthopedic surgeons. As Dr. Emerson points out, in both cases the interest and support of very large groups under expert direction are bringing about results which no professional or philanthropic body could have touched single handed.

McCall's for January contains three articles of great interest from the point of view of health. Dr. Charles Gilmore Kerley discusses correct feeding for children from the third to the eleventh year. He outlines suitable diets without catering to fads. He mentions particularly two bad habits of which mothers frequently complain, and his advice merits repetition:

"If a meal is refused, the child is to go to the next regular mealtime and not have something given in between."

"The first meal of the day should be given early and always on time. The tardy breakfast, at 8:30 or 9 o'clock, is responsible for many cases of an habitually poor appetite."

Dr. E. V. McCollum and Nina Simmonds continue their series on correct diets. Attention is called to a new method called "internal bathing" which seems to be a method of controlling the elimination of waste products through proper diet. The authors lay special emphasis on the importance of milk, uncooked fruit or vegetables, and cooked green leafy vegetables in the diet. The final article in this periodical is by Mrs. Winona Wilcox and is entitled "Glands and Conduct." This writer seems to have taken entire the views of Berman concerning the way in which glands regulate human behavior. Questions are answered by references to glands that will hardly bear the test of scientific accuracy. A young lady who relates that she is "irritable and becomes angry at the least offense" and who says she is "high tempered and unsociable," is informed that the trouble is all due to the glands. This, in the words of the late B. L. T., is "quelque diagnosis."

In the February number of *McCall's* Dr. Kerley discusses the feeding of the child who is below normal physically. Mary Marvin, in a common sense article, discusses the care of the mouth. Special stress is laid on the proper brushing of the teeth. Several articles are devoted to suitable cooking of food. The articles by Dr. McCollum concern the diet of the mother before the child's birth, indicating the necessity of taking foods which will aid the building of bony structure.

A poster by Briggs for the New York Association for the Aid of Crippled Children.

The *Delineator* for February contains an excellent article on deep fat frying as a method of preparing food. Dr. Wm. Bayard Long in an essay entitled "When Your Skin Needs a Surgeon" contributes an excellent discussion of the removal of such facial blemishes as birthmarks, pitmarks, warts and superfluous hair.

The *Woman's Home Companion* for January includes a practical article by Dr. Mary Reesor on exercise for the woman who is well. The author describes some practical setting-up exercises. She indicates how a physical examination is used to determine the exercise required. The *Woman's Home Companion* has available reprints of a large number

of articles which have appeared in its columns concerning the care and feeding of children. The list of the pamphlets and the prices follow:

1. Reprints of previous articles: "Is Your Child Under Weight?" "The Climb to the Normal Weight Line," "Your Child's Food Habits," "The Habit of Health," "Does Your Child Get Tired?" "The Value of Happiness," "But My Child Won't Eat," "Common Sense versus Magic," "The Over-Weight Child," "Every Child Over the Top," "Summer is Growing Time," "Camping Out at Home," "Malnutrition in Grown-Ups," "How to Keep Fit at Forty," "A Bottle of Medicine and a Sad Heart," "Letters Mothers Write Me," "Going It Alone," "My New Boss — Myself," "Every Child Free to Gain," "The Weight Chart Campaign," "The Neglected Years From Two to Six," "Are you a 100% Mother?" "The Game of Health." These reprints will be sent to you for 3 cents each, or 69 cents for the set.
2. Weight Record and Form for History and Physical Examination, 35 cents.
3. Table of 100-Calorie Portions of Food, 3 cents.
4. Special Leaflet on Worms, Constipation, and Bed-Wetting, 3 cents.
5. Pamphlet on "Nutrition Clinics and Classes, Their Organization and Conduct," 15 cents.
6. Pamphlet on "How to Organize and Operate a Nutrition Clinic," 8 cents.
7. Directions for a Homemade Shower Bath, 3 cents.
8. Practical Mental Tests for Growing Children, 15 cents.

Institutions and communities may obtain special rates for quantities.

Address Doctor Emerson's Clinic for Delicate Children, care of *Woman's Home Companion*, 381 Fourth Avenue, New York City.

McClure's magazine for February has a special article on the life of Gen. Leonard Wood, who was a physician before he became an army officer and a colonial administrator. Ruth Danenhower Wilson has a discussion on the "too imaginative child" which has to do with psychopathic fantasies. An article by W. J. McNulty describes the dangers of "bootlegged" whisky.

In *Asia* for February, R. W. Cilento describes "Witch Doctoring in Melanesia." The Melanesian Indian has, in his primitive doctoring, all of the superstition and fantasy attached to primitive races throughout the world. The natives indulge in all sorts of charms and incantations. In the treating of wounds and in the opening of abscesses the native doctors are quite adept. The usual apparatus for opening abscesses is a piece of broken glass. The doctor estimates the depth of the abscess and then binds the sharp edge between two pieces of wood so that it cannot penetrate further than this edge. Epilepsy is believed by the natives to be a form of devil possession. The article is well illustrated and forms an excellent contribution to primitive medicine.

The *Health Builder* for January describes the use of routine physical examinations for securing an estimate of the health status of the individual. Miss Clara D. Noyes, national director of the American Red Cross Nursing Service, gives some excellent hints on the care of the invalid at home. The exercise habits of the presidents are discussed by Lewis Wood. Dr. Herbert L. Wheeler describes the causes of pyorrhea. Dr. W. E. Anderson, director of the Yale University Gymnasium, discusses the limitation which should be placed on strenuous athletics. A practical illustrated article by Dr. J. E. Greaves gives some points on the prevention of infection. Another article has to do with the methods used by congressmen in keeping in training. An important paper by Dr. Harold L. Amoss discusses Pasteur's discovery for the prevention of rabies, or hydrophobia.

WEIGHT AND HEIGHT AS AN INDEX OF NUTRITION

Medical officers of the United States Public Health Service recently conducted physical examinations on 9,973 school children from six to sixteen years of age in South Carolina, Virginia, Maryland, Delaware, and New York, and graded them according to nutrition, judged from clinical evidence, as "excellent," "good," "fair," and "poor." The children were weighed and measured at the time of the examinations. The results are reported by Clark, Sydenstricker, and Collins in the Public Health Reports for January 12, 1923. The authors constructed curves showing the percentage distribution of children in each of the four nutrition groups, according to the percentage deviation from the average weight of all children of the same sex and age. The curves showed also that some children who were graded "good" weighed less than others graded "fair," and that some graded "excellent" actually weighed less than some graded "poor." On the average, the children of poorer nutrition weighed less than those of better nutrition, but weight alone did not seem sufficient for determining the nutrition of a given child. The percentage of children who were "fair" or "poor," judged from clinical evidence, varied with age. It increased in the six to eight year age groups, and declined in succeeding age groups. There was no significant difference in this respect between boys and girls. The percentage of children who were underweight (10 per cent. below), and the percentage who were overweight (20 per cent. above), according to Wood's table for sex, age, and height, increased with age through the fourteenth year for girls, and through the sixteenth year for boys. Girls showed a consistently higher percentage of underweight, and a consistently higher percentage of overweight than boys. The authors conclude that a physical examination by a trained physician should supplement physical measurements in the selection of individual cases of poor nutrition, and that if average weight is to be used as even a rough index of nutrition, it seems that the percentage variations from the average allowed as normal should vary with sexes and ages, rather than be a constant, as usually is accepted in health work.

SIZE AND SUCCESSFUL SALESMANSHIP

When the American Psychological Association met in Boston during December, Dr. H. D. Kitson of Indiana University stated that a study of six hundred salesmen of footwear and insurance had revealed the fact that medium-sized men are the most successful salesmen. Dr. Kitson pointed out that it is generally believed that height and weight are important characteristics so that the salesman can dominate and impress his client by mere animal bulk. Nevertheless, actual investigation revealed that in the case of two or three companies, tall and heavy men were among the poorest salesmen as often as among the best. In fact, an average of the best salesmen revealed an optimum height for successful selling of five feet nine inches. While it is comforting to have a well known fact proved by an actual demonstration, the history of the world shows far too many instances of great minds and powers residing in small, distorted or physically weak frames to permit any general belief that pure bulk is a vital factor for success.

Oh! Very Well

OUR MOTTOES

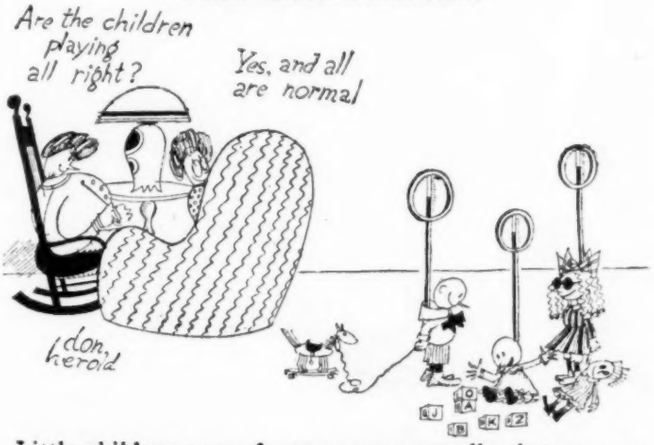
He laughs best who laughs last. That's why "Oh! Very Well!" is at the end of the book.

Fools rush in and measles quickly spreads.

Where ignorance is a blister, a little knowledge lets the pus escape.

A fool and his health are soon parted.

THE KIDDOMETER



Little children run a fever so unexpectedly that we suggest these large thermometer gauges which can be read clear across the room.

Courtesy of Judge

Our Own Health Hints

"F. J. C. Q.—I am troubled with intense itching between my toes. This trouble seems to be very worse much worse at night. Can you suggest a remedy?"—Dr. Copeland's column.

One simple remedy we use
For itch between our toes
We hastily take off our shoes
And then turn on our hose.

Keith Preston.

SOME HYGIENIC SINNERS

1. The waitress who carries a napkin under her arm and wipes off your plate with it.
2. The cook who tastes from the pot and stirs with the tasting spoon.
3. The fruit stand owner who exhales on your apple and polishes it with his sleeve before he gives it to you.
4. The wise old bird who still insists there aint no no sich thing as germs.
5. The employer who does not supply adequate sanitary facilities for his help.
6. The waiter with the itching head and the prickly moustache.
7. The barber with the universal styptic stick and the shaving mug that is seldom washed.
8. The roller towel.

HOW TO KNOW THE ANOPHELES FROM THE CULEX

When you locate a mosquito on the ceiling or the wall,
If it stands there on the level, then don't be scared at all;
It is just a common culex; it can bite and it can sing,
But there's really nothing deadly in its aggravating sting.

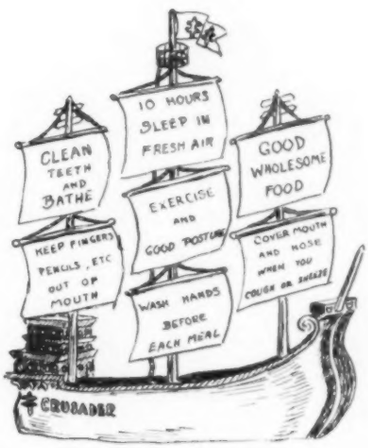
It's the kind whose tails point outward from the wall on which they light
That you want to swat, and swat to kill, and swat with all your might.
This mosquito that stands upright is the breeder of disease,
That fills you with malaria germs, the dread anopheles.

C. E. Craven.

TO THE PHYSICIANS OF THE WORLD

There was a time in ages past when Woe,
Disease, Disaster, Death and all their train,
Stalked through the world unchecked, time and again,
And blasted all on whom their breath would blow,
And felled by millions, men caught in their tow.
Live offerings and altar rites were vain
When offered up to gods then thought to reign;
And Sorrow walked the Land with eyes bent low,
Until one day from out her bosom sprung
A band of dauntless men in armor dressed,
Who leaped to arms, their battle-flags unfurled,
And grappled with the Foe and from him wrung
Relief to Man, by ills so long oppressed.
Physicians they, Protectors of the World.

Jack Bennett.


CLEAN TEETH AND BATHE
10 HOURS SLEEP IN FRESH AIR
GOOD WHOLESOME FOOD
EXERCISE AND GOOD POSTURE
KEEP FINGERS PENCILS, ETC OUT OF MOUTH
COVER MOUTH AND NOSE WHEN YOU COUGH OR SNEEZE
WASH HANDS BEFORE EACH MEAL
CRUSADER

The health ship goes a sailing
Upon life's stormy sea,
Disease waves keep on breaking,
But never a care gives she!
Her sails all set and flying
She rides them merrily!

THE REAL SPRING DRIVE BEGINS WHEN THE GOLFER PUTS THE LITTLE WHITE PILL ON THE LITTLE MOUND OF SAND AND BANGS IT TWO HUNDRED AND FIFTY YARDS TOWARD THE FIRST HOLE.

COUNTING THE CALORIES

Just by counting costs and calories
Men have won colossal salaries
  As every modern dietitian knows;
It's conserving all your forces
And not squandering the courses
  Of a dinner that makes human dynamos.

You are hopeless till you're able
As you sit down to the table
  To analyse the bill right off the reel;
With the menu as a basis
Calculate to fourteen places
  Of decimals the content of your meal.

Solve your personal equation
By reducing on occasion
  If your system seems to tend to the obese;
If you need to multiply
Your circumference take pie
  Or some goodie that's equivalent in grease.

To secure the right requital
From your victuals it is vital
  On calories yourself to educate,
For today the one world beater
Is the lightning calcul-eater
  As all modern dietitians demonstrate.

Keith Preston.

WHY HE LOST HIS FRIENDS

1. He was suspicious of everybody.
2. He measured them by their ability to advance him.
3. He borrowed money from them.
4. He could not bear the slightest criticism without losing his temper.
5. Whenever he heard music he would beat time with his foot.
6. He talked no talk but shop talk.

Here's Lightnin' Bill upon a hill,
The Jedge has laid a stymie,
Chick Evans smiles with right good will,
While Morgan thinks: "Gosh blime me!"

THE PEOPLE'S HEALTH CREDO

The average person believes:

1. That celery is good for the nerves.
2. That fish is a brain food.
3. That the combination of oysters and ice cream produces fatal poisoning.
4. That if cousins marry the children will be nervous wrecks or imbeciles.
5. That the hair is full of sap and that singeing keeps the sap in.
6. That men who wear thick eyeglasses are brainy.
7. That pain in the back means kidney disease.
8. That hunchback is caused by a fall.

Why the Editor Changed Style on the Birth Notices

Carthage (Illinois) Journal

Born to Mr. and Mrs. Noah Delancy, a son, the 24th.

AFTERTHOUGHTS

In the great warfare between science and disease there are few armistices and no peace table. Yet like the great war, it goes unceasingly on.

One of life's little inconsistencies: a Christian scientist buying a package of predigested cereal.

"When an obituary states that the dead man had the courage of his convictions," says the Atchison Globe, "that means he was as stubborn as a goat."

In January, 1910, there were, in the United States, 62,683 single men insane and 26,047 married men insane—which shows that the crazy men stay single. At the same time there were 37,115 single women insane and 35,975 married women insane—which shows that in January, 1910, married life made more women crazy than it did men. And there are a great many more ideas in these figures if you can only figure them out.

SPRING FEVER

Laziness, weariness,
Cheeriness, dreariness,
Happiness, I'll confess
I'm feeling tired!
A stretch and a yawn—
A feeling you're gone—
Spring fever, son!
Wake up! You're fired!

METHUSELAH

"Methuselah, I will agree,
Lived many years," said Doarch,
"But think how long he'd lived if he
Had used a sleeping porch."

Luke McLuke.

We hate to call the scripture wrong,
  But how can it be true
That any man could live so long,
  And have his tonsils too.

Cleveland Plain Dealer.

Methuselah was very wise,
  As wise as any solon,
He kept his health for many years,
  By tending to his colon.

(Continued on adv. page 8)